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FINAL ENVIRONMENTAL STATEMENT

PROPOSED DOMESTIC LIVESTOCK GRAZING PROGRAM FOR THE UNCOMPAHGRE BASIN RESOURCE AREA

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

Director, Bureau of Land Management

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SUMMARY

( ) Draft (X) Final Environmental Statement.

Department of the Interior, Bureau of Land Management.

1. Type of Action: (X) Administrative ( ) Legislative.

2. Brief Description of Action: The Bureau of Land Management proposes to implement a domestic livestock grazing program for the Uncompaghre Basin Resource Area (approximately 525,775 acres of national resource lands) in the Montrose District, located in west central Colorado. The overall objective of the proposed action is to increase livestock/wildlife forage by 12,645 AUMs, from a total of 51,315 AUMs existing now to a total of 63,960 AUMs by 2006. Components of the proposed action are: (1) improved management of grazing through allotment management plans (AMPs) on 479,265 acres (including rest rotation grazing on 404,300 acres, deferred rotation grazing on 23,600 acres, and deferred grazing on 51,365 acres); (2) trailing on 480 acres; (3) custodial management on 29,460 acres; (4) elimination of grazing on 3,020 acres; and (5) continuation of unallotted status (no grazing) on 13,550 acres. Construction of various range improvements would be required to implement the AMPs.

3. Summary of Environmental Impacts: Runoff and erosion would decrease as a result of improved watershed conditions; vegetation would improve in quantity and quality; terrestrial wildlife habitat would improve, resulting in population increases; aquatic and riparian habitat would improve or stabilize on allotments with AMPs; livestock forage would increase; area income would increase. Overall visual quality would not be reduced by range improvements. Impacts on recreation would be negligible.

Short-term adverse impacts would include reduced vegetative vigor and reproduction due to spring and summer grazing and to range improvements; and increased wildlife-livestock competition on crucial winter ranges. Long-term adverse impacts would include some stream bank deterioration by grazing and trampling; and some cultural sites damaged by cattle rubbing and open to vandalism.

4. Alternatives Considered:
   - A. Continuation of Present Grazing Program
   - B. Elimination of Grazing
   - C. Custodial Management
   - D. Reduced Livestock Grazing
   - E. Elimination of Grazing on Allotments with Soils in Severe and Critical Erosion Classes

5. Comments Requested From the Following: See attachment.

COORDINATION IN THE REVIEW OF THE DRAFT ENVIRONMENTAL STATEMENT

Comments on the draft environmental statement were requested from the following agencies and interest groups.

Colorado State Agencies:
- Governor's Clearing House
- Division of Wildlife*
- Division of Planning*

County Commissioners:
- Delta County*
- Montrose County
- Ouray County*
- Gunnison County
- Mesa County

Environmental Protection Agency*

Department of the Interior:
- U.S. Fish and Wildlife Service
- Bureau of Reclamation*
- Bureau of Outdoor Recreation*
- U.S. Geological Survey
- Bureau of Mines
- National Park Service

Department of Agriculture:
- U.S. Forest Service
- Soil Conservation Service

Department of Commerce

Other Organizations:
- Sierra Club
- Colorado Open Space Council*
- Izaak Walton League
- The Wildlife Society
- Colorado Cattlemen's Association*
- Colorado Wool Growers Association
- Audubon Society*
- Natural Resources Defense Council*
- Society of Range Management
- Wilderness Society
- Rocky Mountain Center on Environment
- Advisory Council on Historic Preservation*
- Institute of Ecology
- Trout Unlimited
- Colorado Historical Society*

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*Responded with written comments.

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CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

PROPOSED ACTION

Introduction

The Bureau of Land Management (BLM) proposes to implement an improved grazing management program in the Uncompahgre Basin Resource Area of the Montrose District (see figure 1-1). The proposed action includes the following components (which are discussed in detail under Components).

1. Allotment management plans (AMPs) would be implemented on 70 allotments totaling 479,265 acres of national resource lands (NRL): 60 undivided allotments plus 10 allotments divided into a total of 20 allotment subunits. (Allotments and allotment subunits are defined at the beginning of the components section.) The 70 AMPs would involve the following three grazing systems:

   a. rest rotation systems on 40 undivided allotments and 14 allotment subunits, on a total of 404,300 acres;

   b. deferred rotation systems on 9 undivided allotments and on 2 allotment subunits, on a total of 23,600 acres; and

   c. deferred systems on 11 undivided allotments and on 4 allotment subunits, on a total of 51,365 acres.

2. Limited trailing use would replace fall grazing on 1 undivided allotment, covering 480 acres of NRL.

3. Custodial management of grazing is proposed for 72 undivided allotments and 5 allotment subunits, on a total of 29,460 acres of NRL.

4. Livestock grazing would be eliminated on 9 undivided allotments, covering 3,020 acres of NRL.

5. Unallotted status (no grazing use) would be continued on 45 tracts of NRL, totaling 13,550 acres. Table 1-1 lists all of the allotments (marked by numbers) and allotment subunits (marked by letters) in the ES area and indicates the kind of grazing management proposed for each.

In addition, implementation of the AMPs (component 1) would require range improvements and rangeland vegetation conversion. Thirteen types of range improvements are proposed for various allotments: fences, boundary markers, cattleguards, stock trails, pipelines, water taps, vertical wells, horizontal wells, springs, rainfall catchments, reservoirs, water storage tanks, and water troughs. Vegetation conversion would be by chaining and reseeding, interseeding, or contour furrowing and reseeding. These projects are discussed at the end of the components section.

The proposed action would affect approximately 525,775 acres of NRL. The heart of the action is 70 allotments (i.e., 60 individual allotments and 10 allotments with subunits) covering about 479,265 acres. Private, state, and other lands which the 146 operators utilize additionally may be indirectly influenced by this plan but do not come directly under its control. Table 1-2 shows the types and amounts of land that would be affected by the proposal.

This proposal is related to four significant sets of conditions, each of which is explained more fully in other sections of this chapter or in chapters 2 and 3. Those conditions are (1) the specific goals and objectives of grazing management established for the resource area, within the constraints and objectives of the management framework plans (MFPs) for that area, (2) the grazing system pattern proposed for the allotments, (3) the existing resource conditions found upon the land in the allotments, and (4) the relationship of the proposed grazing system pattern to those resource conditions.

Many of the technical terms used in this environmental statement (ES) are defined in the glossary at the end of the document; however, some key terms are also briefly explained in the text.

Purpose and Objectives

The purpose of the proposed action is to produce (at the time of implementation) 51,315 animal unit months (AUMs) of forage identified in the Uncompahgre Basin's planning documents. (An AUM is the amount of forage required to sustain one cow or five sheep for a month.) The proposal would establish and hold aggregate use on the area at 33,317 AUMs of livestock forage for the planning period (28 years), a net reduction in present licensed use of 2,052 AUMs per year. The remaining 17,998 AUMs would be available for wildlife. Table 1-3 shows the initial proposed use levels for livestock and wildlife in the resource area (ES area).

The long-term objective of the proposed action is to increase production by 12,645 AUMs to a total of 63,960 AUMs by the end of the planning

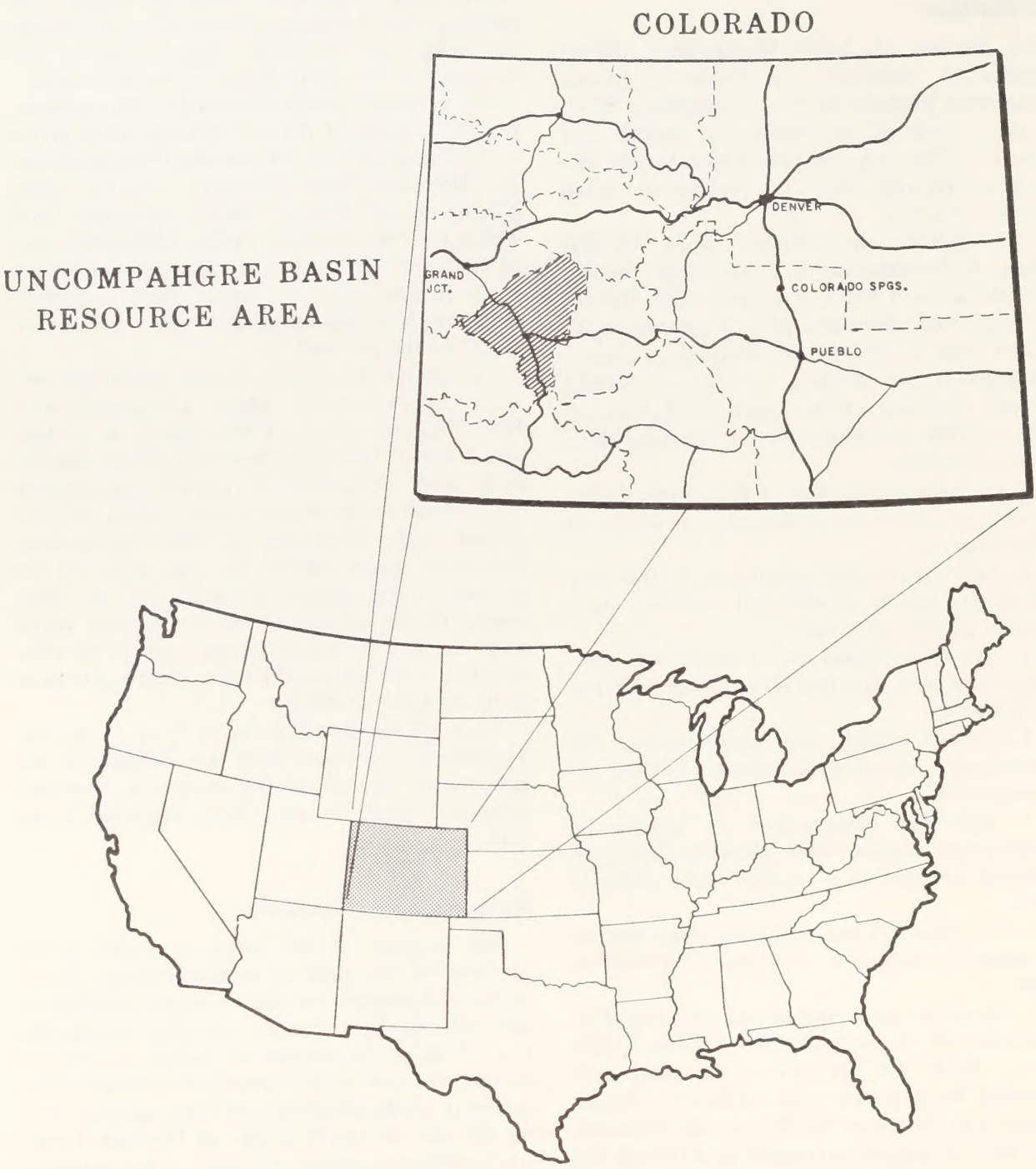


Figure 1-1

LOCATION MAP

TABLE 1-1
ALLOTMENTS AND ALLOTMENT SUBUNITS

RR	4001	Dominguez
D	4002	Lower Escalante
C	4005	Fall Cabin
	4006	Dry Mesa:
RR	A	Escalante Subunit
RR	B	Dry Mesa Subunit
C	C	Smith Ranch Subunit
C	D	Escalante Creek Subunit
D	4007	Sawmill Mesa
D	4008	25 Mesa
RR	4010	Monitor Mesa
T	4011	Lower Roubideau Canyon
RR	4012	Canal
RR	4013	Ben Lowe
C	4014	Joker
C	4015	White Ranch
RR	4016	Wells Gulch
RR	4017	Alkali Flats
RR	4021	Point Creek
	4022	Petrie Mesa:
RR	E	Peach Valley Subunit
D	F	Petrie Mesa Subunit
RR	4024	Dirty George
RR	4025	Ward Creek-Doughspoon
C	4026	Escalante Canyon
C	4501	Milk Creek
DR	4502	Surface to Leroux
RR	4503	Stingley Gulch
RR	4504	Leroux Creek
C	4505	Juniper Knob
	4506	Oak Mesa:
RR	G	Subunit 1
RR	H	Subunit 2
RR	4507	Jay Creek
C	4509	Upper Jay Creek
C	4511	Overland
C	4512	East Roatcap
	4513	Stevens Gulch:
RR	I	Roatcap Creek Subunit
RR	J	Terror Creek Subunit
C	4514	Upper Terror Creek
C	4515	Freeman Gulch
	4516	North Fork:
RR	K	South-of-Hotchkiss Subunit
RR	L	Hubbard Subunit
RR	M	Deer Basin Subunit
RR	4517	Coal Gulch
C	4518	Pilot Creek
C	4519	Muddy Creek
C	4520	Spring Creek
C	4521	Stock Driveway
C	4522	Downing
C	4523	Williams Creek
C	4524	Deep Creek
RR	4525	Anthracite Creek
C	4526	Crystal Creek
RR	4527	Jumbo Mountain
RR	4528	Oak Ridge
DR	4529	Reynolds Creek
DR	4530	McDonald Mesa
C	4531	Popp Ranch
	4532	McDonald Ranch:
DR	N	Lambing Shed Subunit
D	O	South-of-Town Subunit
D	P	Harrington Subunit
C	4535	Home Place
C	4536	West Young's Peak
	4537	Young's Peak:
RR	Q	Young's Peak Subunit
C	R	Crawford Subunit
C	4538	Missouri Flats
C	4539	Cottonwood Creek
DR	4540	North Saddle Peak
C	4541	Sunshine Mesa
C	4543	South Saddle Peak
C	4548	Creek Bottom
DR	4549	Dry Creek
C	5002	Dedication Site
	5003	Selig Canal:
RR	S	Selig Canal Subunit
C	T	Rawhide-Coffeepot Subunit
RR	5008	Brush Point
RR	5010	Dead Horse
RR	5011	Gould Reservoir

Note: Letters to the left of the columns indicate the proposed management action for each allotment or allotment subunit: RR = rest rotation; DR = deferred rotation; D = deferred; T = trailing; C = custodial; and E = elimination of grazing.

TABLE 1-1
ALLOTMENTS AND ALLOTMENT SUBUNITS (cont.)

C	5012	Cedar Point
RR	5013	Iron Canyon
RR	5014	Poison Springs
RR	5015	Grizzly Gulch
DR	5016	Black Canyon
RR	5017	Green Mountain
RR	5020	Black Ridge
C	5022	Rabbit Gulch
C	5025	Fruitland Mesa
C	5026	Star Nelson Airport
C	5027	Adobe
RR	5028	Doug Creek
DR	5029	Spring Gulch
	5030	Bostwick Park:
RR	U	Black Canyon-Jones Draw Subunit
DR	V	Adobe South Subunit
C	W	Bostwick Park Subunit
C	5033	Pinyon Springs
C	5036	Big Gulch
E	5037	Black Mesa
C	5038	Red Canyon
C	5039	Onion Valley
C	5040	Pine Ridge
C	5041	East Gould Reservoir
C	5043	Collins
C	5044	Big Pasture
C	5045	Black Bullet
C	5046	Big Gulch
C	5047	Mesa Creek
C	5048	Morrow Point
D	5049	Smith Fork
C	5050	Allen Reservoir
RR	5502	Sandy Wash
RR	5503	Green
RR	5504	Roatcap
D	5505	Transfer
RR	5507	Pipeline
RR	5508	Government Springs
C	5509	Coal Creek
C	5510	Bald Hills
RR	5511	Shavano Mesa
RR	5512	Franklin Mesa
D	5513	Dry Creek Basin
C	5514	East Fork Dry Creek
C	5515	Olathe Reservoir
RR	5516	Piney
C	5517	Spring Creek Canyon
D	5518	Dave Wood
	5520	Lower Horsefly:
RR	X	Lower Horsefly Subunit
D	Y	Dry Cedar Subunit
RR	5521	Highway 90
RR	5522	Beaver Hill
RR	5523	Horsefly
C	5524	Duckett Draw
C	5525	Dry Creek
RR	5529	Log Hill
RR	5530	Billy Creek
D	5532	Burro Ridge
C	5533	Onion Lakes
D	5534	Shin Park
C	5535	Cedar Creek
C	5536	South Canal
C	5538	Rock Ditch
RR	5540	Dry Gulch
C	5542	Bosgal
C	5543	Waugh
C	5544	Kelly
C	5545	Henshaw
C	5546	Waterdog Basin
C	5547	Slagle Pass
C	5548	Washboard Rock
C	5549	High Park
C	5551	Dexter Creek
E	5552	Dallas
E	5553	Fisher Creek
E	5555	Taylor Draw
E	5556	Burro Creek
E	5557	Alkali
E	5559	South Fork
E	5560	Cookie Tree
C	5561	East Fork
D	5562	Hillside
C	5563	Moonshine Park
C	5564	Gravel Pit
C	5565	Tommy Creek
DR	5566	Cow Creek
C	5567	Busted Boiler
D	5568	Baldy
RR	5569	Hairpin
DR	5570	Cedar
E	5572	McKenzie Creek
C	5574	Tappan Creek

TABLE 1-2
LAND AFFECTED BY PROPOSAL

Proposed Action (Components)	Allotments & Unallotted Lands Affected by Each Component a/ (Number)	National Resource Lands b/ (Acres)	State Lands c/ (Acres)	Private Lands d/ (Acres)	Uncontrolled Lands e/ (Acres)	Total (Acres)
1. Allotment Management Plans	70*	479,265	1,265	57,695	2,725	540,950
2. Trailing	1	480	0	0	0	480
3. Custodial Management	76**	29,460	0	69,180	0	98,640
4. Elimination of Grazing	9	3,020	0	0	0	3,020
SUBTOTALS	156	512,225	1,265	126,875	2,725	643,090
5. Unallotted Lands	45	13,550	0	0	0	13,550
TOTALS	201	525,775	1,265	126,875	2,725	656,640

a/ Four allotments with subunits are affected by both AMPs and custodial management; therefore, the subtotal is 156 rather than 152, and the total is 201 rather than 197.
b/ Federal land managed by the BLM.
c/ State of Colorado land fenced within the proposed allotment boundaries and leased by the state to range users.
d/ Land owned by range users which is fenced within the proposed allotment boundaries.
e/ Land of various other ownerships, including private, state, and other federal (e.g., national forest lands), which is fenced within the allotment boundaries and not controlled with a lease or a deed by the range user and not included in the management control of this plan.
* 60 individual allotments plus 10 allotments with subunits (20).
** 72 individual allotments plus 4 allotments with subunits (5).

TABLE 1-3.—*Proposed livestock and wildlife use (in AUMs) when proposed action is implemented*

Animal	Season of use [1]	Proposed use at time of implementation (AUMs)
Antelope	Yearlong	600
Deer	Various (Av. 5 mo.)	15,538
Elk	Various (Av. 2 mo.)	1,860
Cattle	Various	17,103
Domestic horses	Various	36
Sheep	Various	16,178
Total		51,315

[1] Variations in seasons of use are due to vast ranges in elevation throughout the ES area. Animals can be located on some portions of NRL regardless of the season.

period (2006). The resource objectives to be met by 2006 are as follows:

1. To meet the increasing demand for livestock forage for red meat production, increase production by 7,162 AUMs to a total of 40,479 AUMs.

2. To improve water quality and watershed condition, reduce the erosion condition class as measured by the soil surface factor (SSF). Specific goals identified for reduction in SSF are:

a. to reduce the SSF by a minimum average of 30 points on 404,300 acres;

b. to reduce the SSF by a minimum average of 20 points on 23,600 acres;

c. to reduce the SSF by a minimum average of 15 points on 51,365 acres;

d. to reduce the SSF by 10 points or less average (defined in phase I watershed inventory procedures as no change) on 29,940 acres;

e. no change on 16,570 acres.

3. To provide a sustained yield of forage for wildlife, increase production by 5,483 AUMs to a total of 23,481 AUMs.

4. To maintain or improve aquatic and riparian habitats, maintain 130.9 miles of stream riparian habitat in present condition and change 28.9 miles as follows:

a. 2.1 miles from nonexistent to good;

b. 17.6 miles from poor to fair;

c. 2.6 miles from poor to good;

d. 1.2 miles from fair to good;

e. 5.4 miles from good to excellent. Corresponding improvements in stream aquatic habitats cannot be quantitatively estimated, but improved watershed conditions and slight decreases in sediment yield would improve aquatic habitat from the present condition.

5. Comply with the unit resource analysis (URA) and MFP objectives for the ES area (as discussed under Interrelationships at the end of chapter 1).

In addition, each AMP has specific twenty-year objectives; these are available for review with each AMP at the Uncompahgre Basin Resource Area office in Montrose.

Components

The proposed action analyzed in this ES would be applied to 152 allotments (512,225 acres) and 45 unallotted units of land (13,550 acres).

An allotment is an area of land where one or more individuals (allottees) graze their livestock. Normally, grazing on an allotment is carried out under a single type of management, such as an AMP or custodial management. This would be true for most of the allotments which are part of the proposed action. For example, allotment 4001 Dominguez would be managed under an AMP with a rest rotation grazing system; allotment 4002 Lower Escalante would be managed under an AMP with a deferred grazing system; and allotment 4005 Fall Cabin would receive custodial management.

However, under the proposed action, ten of the allotments (totaling 97,455 acres) are subdivided into two to four parts (allotment subunits), and each of these subunits would have its own separate grazing management. For example, allotment 5003 Selig Canal consists of two allotment subunits: subunit S Selig Canal (5,660 acres), which would be managed under a rest rotation system, and subunit T Rawhide-Coffeepot (2,005 acres), which would receive custodial management. Each allotment subunit was originally an individual allotment which has been combined with one or more other subunits (also former allotments) into one overall allotment so that their combined resources (watershed, wildlife, vegetation, cultural sites, etc.) could be administered together as one unit. Also, in many cases, all the subunits in one allotment have the same allottee or group of allottees.

The 45 unallotted units of land which are also affected by the proposed action are lands which receive no grazing use. They are discussed under Continuation of No Grazing later in this chapter, following the discussions of AMPs, trailing use, and custodial management.

Map 1-1, enclosed in a packet that accompanies this ES, shows the boundaries of the allotments, allotment subunits, and unallotted tracts. Table 1-4 lists the proposed AMPs, trailing, and custodial management by allotment and allotment subunit. Table 1-5 lists the allotments for which elimination of grazing is proposed. (Pasture level detail for the proposed action is available upon request from the Montrose, Colorado, BLM District Office.)

Allotment Management Plans

An AMP is a livestock grazing plan which provides a specific management program for an allotment based on an analysis of the renewable resource values and potential uses of the allotment. An AMP also sets forth those special stipulations and management practices that will become terms and conditions of a grazing authorization (lease or permit). It establishes the times when the range would be grazed (season of use), the type and number of domestic animals that would be allowed on the range (class of use), and the possible range improvements that would be needed, such as fencing and water development.

The AMP also includes an agreement between the District Manager and the livestock permittee which provides, among other things, "that, should periods of range depletion occur due to prolonged drought, fire or other natural causes, or should habitat requirements of threatened/endangered flora and fauna so warrant adjustment, reduction in numbers of livestock or adjustment in periods of range use may be directed by the District Manager or his authorized representative." A sample agreement is shown in appendix 11.

Events in the ES area during 1977 provide an example of implementation of these provisions. As a result of the limited winter snowfall and reduced spring rainfall, livestock use was decreased from the allowable 33,317 AUMs by 18,000 AUMs to 15,317 AUMs. This reduction was made following inspection of the range. Since this reduction was voluntary (agreed to by the permittees), no action was required pursuant to CFR 4115.2-1(e)(5) which states that: "In the event of range depletion resulting from drought or other causes, the grazing privileges that may be exercised under any license or permit may be reduced in whole or in part, and for such period of time as may be necessary."

As discussed under Objectives above, the overall objective of the Uncompahgre Basin's MFPs and AMPs is to promote the sustained, high-level, periodic output of the various renewable resources found on the allotments. Renewable resource values stem directly or indirectly from vegetation; therefore, following determination of management objectives for an allotment, an AMP was developed for that allotment in accordance with the physiological needs of the key vegetative species (the plants that need the most rest to regain vigor after being grazed during the critical green period). Major points considered in developing these AMPs include:

1. Wildlife: species, seasons of use, and forage needs; conditions of aquatic and riparian habitat;
2. Watershed: conditions and soil characteristics;
3. Livestock: seasons of use, numbers, and class;
4. Vegetation: condition, production, physiological requirements, and existing use;
5. Climate: precipitation, amount, and occurrence;
6. Topography: steepness of slope and elevation;
7. Range Improvements: costs of fencing, water development, and erosion control structures;
8. Land ownership patterns;
9. Other resources: timber, recreation, and minerals.

Livestock graze rangelands selectively by species and area, grazing the most palatable plants and the most accessible area the heaviest. Plants grazed heavily one year tend to be grazed heavily the next, until the choicest plants are gradually destroyed. Livestock then graze on less palatable plants, leading to an ever enlarging area of range deterioration (Hormay 1970; Stoddard and Smith 1955). The principal tool used in AMPs to prevent this spreading effect and to manage vegetation is systematic livestock grazing.

Under the proposed action, the grazing system developed for each allotment or allotment subunit is designed to maintain or improve key vegetative species so that the renewable resource objectives can be achieved for each allotment within twenty years after implementation. The AMPs for the ES area involve three different systems of grazing: rest rotation, deferred rotation, and deferred.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED REST ROTATION GRAZING SYSTEMS					
Two-Treatment					
4006 Dry Mesa:					
A Escalante Subunit*	2,280	C-76	11/27 - 12/31	1	D, E
4503 Stingley Gulch*	1,080	C-98	05/10 - 06/09	2	A, E
4506 Oak Mesa:					
G Subunit 1	600	S-18	09/15 - 09/21	2	C, E
4516 North Fork:					
K South-of-Hotchkiss Subunit	1,395	S-50	04/16 - 05/04	2	A, E
L Hubbard Subunit	1,705	S-46	05/10 - 05/22	2	A, E
5003 Selig Canal:					
S Selig Canal Subunit	5,660	S-378	12/16 - 01/23	3	D, E
5511 Shavano Mesa	2,015	S-200	12/20 - 02/06	4	D, E
5512 Franklin Mesa	3,600	S-350	12/16 - 02/26	1	D, E
5521 Highway 90*	6,215	S-265	03/25 - 06/02	6	A, E
5569 Hairpin	500	S-19	10/01 - 10/06	2	C, E
Three-Treatment					
4010 Monitor Mesa	15,735	C-1,174	05/16 - 05/31 10/16 - 11/30	3	A, C, E
4013 Ben Lowe*	5,490	C-446	05/21 - 05/31 10/16 - 11/30	3	A, C, E
4016 Wells Gulch	16,955	S-2,365	11/15 - 04/30	3	A, D, E
4022 Petrie Mesa:					
E Peach Valley Subunit	11,035	S-1,156	12/01 - 04/30	4	A, D, E
4024 Dirty George	2,385	C-246	05/16 - 06/15 10/16 - 11/01	2	A, C, E
4025 Ward Creek-Doughspoon	17,910	C-435	05/11 - 06/15 10/16 - 11/15	4	A, C, E
4506 Oak Mesa:					
H Subunit 2	750	S-40	06/23 - 06/30 08/15 - 08/28	3	A, C, E

a/ C = cattle; S = sheep; H = domestic horses; AUM = animal unit month.
b/ Applies only to rest rotation systems. Letters refer to rest rotation treatments A through E discussed under the components section: A = spring grazing; B = summer grazing; C = fall grazing; D = winter grazing; and E = yearlong rest from livestock grazing.
* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Three-Treatment (cont.)					
4513 Stevens Gulch:					
I Roatcap Creek Subunit	2,120	C-225	05/16 - 06/15 09/01 - 09/30	4	A, C, E
J Terror Creek Subunit	4,435	C-444	05/27 - 06/15 09/01 - 10/30	5	A, C, E
4516 North Fork:					
M Deer Basin Subunit	20,320	S-1,047	11/16 - 04/17	3	A, D, E
4517 Coal Gulch	7,720	S-370	05/01 - 07/24	2	A, C, E
		C-70	10/01 - 11/13		
4527 Jumbo Mountain	4,970	C-574	05/11 - 06/15 09/16 - 10/20	3	A, C, E
4528 Oak Ridge*	3,600	C-238	05/21 - 06/15 10/16 - 11/04	3	A, C, E
5008 Brush Point	18,205	S-1,118	11/14 - 03/02 04/16 - 05/06	3	A, D, E
		C-32	03/15 - 05/14		
5010 Dead Horse	955	C-113	05/20 - 06/19 09/16 - 10/15	1	A, C, E
5011 Gould Reservoir	2,825	C-203	05/05 - 06/30 09/05 - 10/31	1	A, C, E
5013 Iron Canyon	1,335	C-63	05/15 - 07/10 09/06 - 10/31	1	A, C, E
5014 Poison Springs	1,570	C-66	05/15 - 07/14 09/01 - 10/31	1	A, C, E
5015 Grizzly Gulch	1,930	C-230	05/11 - 05/27 08/16 - 09/02	1	A, C, E
5017 Green Mountain	20,825	S-1,021	05/15 - 07/04 09/15 - 11/12	4	A, C, E
		C-639	05/15 - 07/14		
5020 Black Ridge	6,875	S-400	04/04 - 08/31	4	A, C, E
5028 Doug Creek	400	C-40	05/16 - 06/15 09/01 - 09/30	1	A, C, E
5030 Bostwick Canyon:					
U Black Canyon-Jones Draw Subunit	1,655	C-60	04/21 - 05/16 09/15 - 10/15	3	A, C, E

* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Three-Treatment (cont.)					
5507 Pipeline	19,190	C-1,560	03/16 - 05/09 10/16 - 12/07	5	A, C, E
5529 Log Hill	4,345	C-153	05/16 - 06/13 10/16 - 10/31	4	A, C, E
5530 Billy Creek	3,995	C-135	05/10 - 06/25 08/20 - 09/25	3	A, C, E
		H-2	05/10 - 06/25		
Four-Treatment					
4001 Dominguez	58,335	C-2,068	04/16 - 05/15 10/16 - 01/30	4	A, C, E, D
4006 Dry Mesa:					
B Dry Mesa Subunit*	16,165	C-489	05/08 - 05/31 11/01 - 12/31	4	A, C, E, D
4012 Canal*	10,650	C-831	05/15 - 07/31 10/16 - 11/15 10/15 - 10/30	4	A, B, C, E
4017 Alkali Flats	27,830	S-2,054	12/01 - 05/07	4	A, C, E, D
4021 Point Creek	1,000	S-77	03/15 - 05/20 10/15 - 12/20	1	A, C, E, C
4504 Leroux Creek	2,555	C-190	05/16 - 09/15	5	A, B, C, E
4507 Jay Creek	9,205	C-1,033	05/16 - 10/30	5	A, B, C, E
4525 Anthracite Creek	1,115	C-117	06/04 - 09/01	4	A, C, E, C
4537 Young's Peak:					
Q Young's Peak Subunit*	2,260	C-113	05/15 - 07/14 09/01 - 09/30	1	A, C, E, C
5502 Sandy Wash	7,530	S-707	12/01 - 03/16	3	A, D, E, D
5503 Green	450	C-24	05/30 - 06/19 10/20 - 11/12	1	A, C, E, C
5504 Roatcap	3,070	S-195	05/07 - 06/15 10/16 - 11/24	1	A, C, E, C
5508 Government Springs	2,260	C-83	05/16 - 06/15 10/16 - 11/15	1	A, C, E, C
5520 Lower Horsefly:					
X Lower Horsefly Subunit	5,675	S-304	05/01 - 05/12 10/20 - 11/17	4	A, C, E, C
5522 Beaver Hill	19,785	S-934	05/16 - 06/30 10/01 - 10/20 12/08 - 12/28	5	A, C, E, D

* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Four-Treatment (cont.)					
5523 Horsefly	640	C-15	06/01 - 07/02 09/15 - 11/14	1	A, C, E, C
5540 Dry Gulch	4,860	S-795	05/01 - 06/04 11/01 - 11/12 12/01 - 01/31	1	A, C, E, D
Five-Treatment					
5516 Piney*	8,335	C-540 H-17	06/01 - 10/31	5	A, B, C, E, B
SUBTOTALS	404,300	C-12,823 S-13,909 H- 19 26,751			
PROPOSED DEFERRED ROTATION GRAZING SYSTEMS					
4502 Surface to Leroux*	3,230	C-443	05/26 - 06/15 10/16 - 10/21	2	
4529 Reynolds Creek*	1,200	C-158	06/15 - 06/20 10/06 - 10/11	2	
4530 McDonald Mesa*	3,185	C-122	06/01 - 06/20 10/07 - 10/13	2	
4532 McDonald Ranch: N Lambing Shed Subunit	4,640	S-246	04/06 - 05/15 10/06 - 10/30	2	
4540 North Saddle Peak	240	C-33	06/01 - 08/31	2	
4549 Dry Creek*	3,110	C-193	05/16 - 06/15 10/01 - 11/03	2	
5016 Black Canyon	440	C-45	05/11 - 06/30 10/11 - 10/30		
5029 Spring Gulch	1,430	C-110	06/01 - 09/20	3	
5030 Bostwick Park: V Adobe South Subunit	3,480	C-95	04/16 - 05/31 10/01 - 12/03	3	
5566 Cow Creek	520	C-80	06/20 - 07/30 09/01 - 09/20	1	
5570 Cedar	2,125	C-236	05/15 - 06/14 10/17 - 11/16	2	
SUBTOTALS	23,600	C- 1,515 S- 246 1,761			

* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED DEFERRED GRAZING SYSTEMS					
4002 Lower Escalante	2,240	S-300	01/09 - 01/30	1	
4007 Sawmill Mesa*	12,095	C-341	11/01 - 12/15	1	
4008 25 Mesa*	10,405	C-773	10/15 - 02/28 05/03 - 05/05	1	
4022 Petrie Mesa:					
F Petrie Mesa Subunit	2,825	S-102	12/12 - 01/17	1	
4532 McDonald Ranch:					
O South-of-Town Subunit	2,155	S-246	12/08 - 01/18	1	
P Harrington Subunit	535	S-47 H-7	12/01 - 02/28	1	
5049 Smith Fork	450	C-19	11/01 - 11/06	1	
5505 Transfer	2,970	C-214	10/16 - 11/16	1	
5513 Dry Creek Basin	5,425	S-300	11/01 - 01/31	1	
5518 Dave Wood	2,565	S-144	09/15 - 10/04	1	
5520 Lower Horsefly:					
Y Dry Cedar Subunit	4,690	S-360	01/01 - 02/15	1	
5532 Burro Ridge	200	C-15	08/16 - 09/30	1	
5534 Shin Park	3,970	S-187	12/01 - 01/15	1	
5562 Hillside	160	C-10	08/15 - 09/30	1	
5568 Baldy	680	C-67	08/16 - 09/30	1	
		C-1,439 S-1,686 H- 7			
SUBTOTALS	51,365	3,132			
PROPOSED TRAILING USE					
4011 Lower Roubideau Canyon	480	C-27	05/15 - 05/20 10/15 - 10/20		
SUBTOTALS	480	C-27 27			
PROPOSED CUSTODIAL ALLOTMENTS					
4005 Fall Cabin	360	C-18	05/11 - 05/31 10/16 - 10/31		
4006 Dry Mesa:					
C Smith Ranch Subunit*	150	C-50	04/25 - 05/31		
D Escalante Creek Subunit*	300	C-50	04/25 - 04/27		
4014 Joker	1,835	C-87	05/21 - 10/31		
4015 White Ranch	415	C-10	04/01 - 05/31 10/16 - 02/28		

* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (cont.)					
4026 Escalante Canyon	1,270	C-20	01/01 - 02/07		
4501 Milk Creek	105	C-16	08/15 - 08/31		
4505 Juniper Knob	120	S-10	05/01 - 06/05		
4509 Upper Jay Creek	430	C-66	05/20 - 06/15		
			09/15 - 10/30		
4511 Overland	160	C-14	06/16 - 06/30		
			10/16 - 10/30		
4512 East Roatcap	30	C-10	06/19 - 10/12		
4514 Upper Terror Creek	30	C-3	09/15 - 10/15		
4515 Freeman Gulch	620	C-53	06/01 - 10/31		
4518 Pilot Creek	45	S-33	06/16 - 07/30		
			10/11 - 11/12		
4519 Muddy Creek	500	S-16	05/16 - 06/25		
4520 Spring Creek	120	C-25	06/12 - 09/15		
4521 Stock Driveway	120	S-6	06/01 - 06/06		
			11/01 - 11/06		
4522 Downing	120	C-24	05/26 - 06/17		
			09/16 - 09/30		
4523 Williams Creek	110	C-8	05/16 - 07/15		
4524 Deep Creek	160	C-3	06/01 - 10/15		
4526 Crystal Creek	480	C-51	05/16 - 09/30		
4531 Popp Ranch	265	C-4	05/15 - 06/14		
4535 Home Place	160	C-15	10/07 - 10/15		
4536 West Young's Peak	160	C-6	05/01 - 07/31		
4537 Young's Peak:					
R Crawford Subunit*	260	C-22	06/17 - 06/25		
4538 Missouri Flats	120	C-4	06/12 - 09/15		
4539 Cottonwood Creek	120	C-8	05/20 - 06/03		
			09/15 - 09/29		
4541 Sunshine Mesa	40	C-5	05/16 - 06/15		
4543 South Saddle Peak	220	C-13	06/16 - 06/20		
			10/10 - 10/15		
4548 Creek Bottom	185	C-5	06/01 - 10/15		
5002 Dedication Site	1,915	C-44	03/01 - 04/06		
5003 Selig Canal:					
T Rawhide-Coffeepot Subunit	2,005	S-32	05/16 - 05/25		
			10/01 - 10/10		
5012 Cedar Point	620	C-55	05/30 - 06/30		
			09/01 - 09/30		
5022 Rabbit Gulch	1,250	C-35	11/20 - 12/14		
5025 Fruitland Mesa	80	S-2	05/01 - 11/30		
5026 Star Nelson Airport	80	C-5	01/02 - 02/28		

* Already implemented.

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
5027 Adobe	300	C-24	05/15 - 06/14		
5030 Bostwick Park:					
W Bostwick Park Subunit	360	C-4	05/01 - 06/15		
5033 Pinyon Springs	1,030	C-131	06/02 - 10/16		
5036 Big Gulch	40	S-5	11/01 - 11/30		
5038 Red Canyon	80	C-3	05/10 - 10/30		
5039 Onion Valley	40	C-16	07/01 - 09/01		
		H-1	09/01 - 11/15		
5040 Pine Ridge	80	C-14	06/01 - 11/15		
5041 East Gould Reservoir	620	C-20	06/06 - 06/15		
5043 Collins	200	C-10	05/05 - 06/04		
5044 Big Pasture	200	C-15	05/16 - 06/15		
5045 Black Bullet	90	H-3	11/01 - 11/30		
5046 Big Gulch	440	S-35	03/02 - 04/17		
5047 Mesa Creek	640	C-55	05/01 - 10/15		
5048 Morrow Point	1,035	C-8	05/20 - 06/10		
5050 Allen Reservoir	200	C-24	05/16 - 06/04		
			10/16 - 10/20		
5509 Coal Creek	320	C-44	05/16 - 05/30		
			11/08 - 11/15		
5510 Bald Hills	205	C-21	05/29 - 06/30		
			10/11 - 11/09		
5514 East Fork Dry Creek	135	C-11	06/01 - 10/27		
5515 Olathe Reservoir	185	C-17	05/16 - 10/15		
5517 Spring Creek Canyon	440	C-35	05/31 - 10/15		
5524 Duckett Draw	275	C-6	04/01 - 05/31		
			11/01 - 12/31		
5525 Dry Creek	100	C-9	09/20 - 10/19		
5533 Onion Lakes	630	C-15	10/16 - 11/30		
5535 Cedar Creek	240	C-6	06/01 - 06/30		
5536 South Canal	2,115	S-57	01/01 - 01/17		
5538 Rock Ditch	55	C-5	11/01 - 11/30		
5542 Bosgal	50	S-5	09/01 - 02/28		
5543 Waugh	200	S-10	12/16 - 02/28		
5544 Kelly	80	S-2	11/01 - 12/15		
5545 Henshaw	170	S-12	10/15 - 11/15		
5546 Waterdog Basin	400	C-35	03/20 - 10/30		
5547 Slagle Pass	310	C-30	07/28 - 09/27		
5548 Washboard Rock	760	S-34	05/16 - 09/15		
5549 High Park	1,660	S-60	07/01 - 09/30		
		H-1			
5551 Dexter Creek	65	H-3	06/01 - 06/21		
5561 East Fork	80	S-3	06/15 - 07/31		
		H-2	06/15 - 07/31		
			10/01 - 10/31		
5563 Moonshine Park	230	C-7	07/01 - 09/30		
5564 Gravel Pit	40	S-4	10/01 - 11/08		

TABLE 1-4
SUMMARY OF PROPOSED ACTION BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (cont.)					
5565 Tommy Creek	120	C-3	04/16 - 06/15		
5567 Busted Boiler	40	C-2	08/01 - 09/30		
5574 Tappan Creek	240	S-11	04/11 - 05/10 11/15 - 11/19		
		C-1,299 S- 337 H- 10			
SUBTOTALS	29,460	1,646			
		C-17,103 S-16,178 H- 36			
TOTALS	509,205	33,317			

TABLE 1-5
PROPOSED ELIMINATION OF GRAZING

Tract	Acres NRL	AUMs Eliminated
5037 Black Mesa	500	6
5552 Dallas	240	24
5553 Fisher Creek	480	34
5555 Taylor Draw	325	55
5556 Burro Creek	120	15
5557 Alkali	485	20
5559 South Fork	120	12
5560 Cookie Tree	640	55
5572 McKenzie Creek	110	5
TOTALS	3,020	226

(Table 1-6 summarizes the AMPs proposed for the ES area. Refer to appendix 12 for schematic diagrams typifying each system.)

TABLE 1-6.—*Summary of proposed allotment management plans*

Grazing system	Number of allotments and subunits	Total AUMs	Total acres NRL
Rest rotation:			
Two treatments	10	1,500	25,050
Three treatments	26	14,665	197,530
Four treatments	17	10,029	173,385
Five treatments	1	557	8,335
Subtotal	54	26,751	404,300
Deferred rotation	11	1,761	23,600
Deferred	15	3,132	51,365
Total	80	31,644	479,265

REST ROTATION GRAZING

In a rest rotation system, the range area affected would be divided into pastures of comparable grazing capacities. The pastures would be systematically grazed and rested, providing for the production of livestock and other resource values while simultaneously maintaining or improving the vegetation and soil (Hormay 1970). This system would reserve portions of the range from livestock grazing until after plants have made and stored food (recovered vigor) and seeds have ripened; it would also provide rest in the following growing season, allowing seedlings to become established and litter to accumulate between plants. According to Hormay (1970), resource values would be maintained and improved almost entirely by this timely resting of the range from use.

Rest rotation grazing systems would be used on 40 allotments and 14 subunits (totaling 404,300 acres, 77 percent of NRL in the ES area) that have uneven livestock distribution, unsatisfactory range condition, and a large acreage or percentage of NRL. The more accessible areas of the allotments are heavily used by livestock, and the less accessible areas are lightly used. Rest rotation grazing can benefit such ranges by reducing and balancing utilization without reducing the number of animals grazed (W. M. Johnson 1965). According to Johnson's study such benefits may be the result of several processes: increased plant vigor may cause increased total production of vegetation; growth and production of vegetation may be nearly completed before livestock grazing is allowed each year on all but one pasture of an allotment; and the previous year's growth, which is mixed with the current year's growth, may provide more bulk in the diet. Such findings are contrary to the common belief that one pasture in a rest rotation system is always severely overutilized.

Grazing Treatments

Each year, each pasture in an allotment or allotment subunit would be grazed by livestock or rested from livestock use at specific times for specific reasons (grazing treatments). Rest rotation grazing may include two, three, four, or more of the following treatments as required on a site specific basis (by definition, it must include Treatment E, i.e., a year of rest). Dates indicated are typical and would vary with each allotment.

TREATMENT A. Treatment A consists of grazing a pasture for livestock production in the spring (5/15 to 6/15), then resting the pasture for the remainder of the year (6/16 to 5/14).

TREATMENT B. Treatment B consists of resting a pasture from livestock grazing (9/1 to 7/14) until after the key species flower (mid-July), then allowing it to be grazed by livestock during the summer (7/15 to 8/31). By the time the pasture is grazed, plants have nearly completed their food storage for the season, and seedlings established during the previous yearlong rest period have been able to put out secondary roots which would keep the livestock from pulling up and destroying new, tender plants. (Hormay 1970)

TREATMENT C. Treatment C consists of resting a pasture from livestock grazing (1/1 to 8/15) until after seedripe of the key grass and forbs species, then allowing it to be grazed by livestock during the fall (8/16 to 12/31). Seedripe occurs around the end of July; by that time, the seeds have matured enough so that, if planted, they would produce seedlings the following spring. While grazing, the livestock would trample the seeds, thereby assuring that the seeds would be planted. With this treatment, growing season rest is provided for all plants.

TREATMENT D. Treatment D consists of resting a pasture from livestock grazing (2/16 to 11/16) until after seedripe of the key shrub species (mid-October), then allowing it to be grazed by livestock during the winter (11/17 to 2/15). As with Treatment C, growing season rest is provided for all plants.

TREATMENT E. Treatment E consists of resting a pasture from livestock grazing for an entire year.

Application of Treatments

If an allotment consists of one pasture, the necessary treatments would be applied to it in succeeding years, one treatment per year. If an allotment is divided into two to six pastures, the necessary treatments would be applied to each pasture in turn, one treatment per pasture per year.

Specific beginning and ending dates for each treatment would be determined during the development stages of the key species on each allotment. Table 1-7 shows the average dates for the development stages of grasses, forbs, and shrubs in the ES area.

Livestock typically would be trailed to allotments, but occasionally they would be hauled or trucked. Animal movement from pasture to pasture between treatments would be accomplished by allowing natural drift or by herding. At the conclusion of grazing, livestock would normally be trailed to the national forest, other range, or back to the ranch property.

Table 1-4 identifies acres of NRL, class of use, number of AUMs, season of use, number of pastures, and number and kinds of treatments for each allotment or allotment subunit under rest rotation grazing.

DEFERRED ROTATION GRAZING

Deferred rotation is the discontinuance of grazing on various parts of a range in succeeding years. One out of two pastures or two out of three pastures in an allotment or subunit would be grazed in the spring for livestock production, while the remaining pasture would be rested until after seedripe and then grazed. This grazing sequence would be rotated among the pastures in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor (American Society of Range Management 1964).

Deferred rotation grazing would be used on nine allotments and two subunits, affecting 23,600 acres (4 percent of NRL in the ES area). Table 1-4 identifies acres of NRL, class of use, number of AUMs, season of use, and number of pastures for allotments and allotment subunits under deferred rotation grazing.

DEFERRED GRAZING

Deferred grazing is the discontinuance of grazing by livestock on an area for a specified period of time during the growing season. Under this system, grazing would begin some time after July 1, when the plants have reached an advanced stage of development in their annual growth cycle. The growing season rest provided by this system would promote plant reproduction, establishment of new plants, or restoration of vigor by old plants (American Society of Range Management 1964).

Deferred systems would be used on small one-pasture allotments (eleven) and subunits (four) for which high cost would prohibit the construction of range improvements. They would affect 51,365 acres (10 percent of NRL in the ES area). Table 1-4 identifies acres of NRL, class of use, number of AUMs, and season of use for allotments and allotment subunits under deferred grazing.

EVALUATION PROCEDURES

Evaluation procedures are built into each AMP. They are discussed in chapter 4 under Study and Monitoring Procedures.

Trailing Use

In addition to present licensed grazing use on 4011 Lower Roubideau Canyon (65 AUMs, 10/6-10/21), movement of cattle through the canyon has been permitted for users of 4010 Monitor Mesa. There have also been allowances for some overnight fall use and trailing use by other livestock operators. There is no way to know the past actual trailing use through the area because no trailing permits were issued. However, under the proposed action, fall grazing and unlicensed trailing would be replaced by licensed and limited (one day each way) trailing, as shown in table 1-4, affecting 480 acres (less than 0.1 percent of NRL in the ES area).

Custodial Management of Grazing

Custodial management is proposed for 72 allotments and 5 allotment subunits (covering 29,460 acres, 5 percent of NRL in the ES area) where the public land acreage is small in comparison with the total area grazed, and/or on allotments on which it was not economically feasible to implement an AMP and where trend is stable. This was determined through the BLM planning process, which includes careful scrutiny of each allotment by resource specialists and public par-

TABLE 1-7
PHENOLOGICAL SUMMARY

Species		Start		Peak of	Seed	Seed
Common Name	Species Abbrev.	Growth	Flowering	Flowering	Ripe	Dissemination
GRASSES						
Crested wheatgrass	Agcr	04/01	05/15	06/13	06/25	07/05
Western wheatgrass	Agsm	04/15	06/25	07/10	07/30	09/01
Slender wheatgrass	Agtr	04/01	06/01	06/20	07/15	08/01
Intermediate wheatgrass	Agin	04/01	05/10		07/25	08/25
Smooth brome	Brin	04/01	05/31	06/03	06/20	07/01
Blue grama	Bogr	04/15	06/25	07/25	09/01	10/01
Idaho fescue	Feid	04/01	05/31	06/03	06/20	07/01
Galleta grass	Hija	04/15	06/15	07/01	08/20	09/01
Junegrass	Kocr	05/01	05/31	06/04	06/20	07/01
Indian ricegrass	Orhy	03/21	05/20	06/15	08/10	08/31
Kentucky bluegrass	Popr	03/15	05/01	05/15	07/20	09/01
Sandberg bluegrass	Pose	03/15	05/15	06/01	07/25	08/15
Squirreltail	Sihy	03/28	05/24	06/15	07/01	07/15
Alkali sacaton	Spai	05/01	07/20	08/10	09/08	09/15
Sand dropseed	Spcr	05/01	07/20	08/10	09/08	09/15
Needle-and-thread	Stco	04/15	05/15	07/01	07/20	08/01
Sleepygrass	Stro	03/15	04/29	06/25	07/01	07/10
Green needlegrass	Stvi	03/15	05/01	06/25	07/01	07/15
FORBS						
Arrowleaf balsamroot	Basa	05/15	06/01	07/01	07/15	07/15
Yellow sweetclover	Meof	03/22	05/15	05/25	06/25	07/15
American vetch	Viam	05/15	06/01	06/20	07/02	07/15
SHRUBS						
Common serviceberry	Amal	05/06	05/28	06/01	10/15	10/30
Black sagebrush	Arno	04/20	07/10	08/15	09/15	09/30
Big sagebrush	Artr	04/20	07/10	08/15	09/15	10/10
Fourwing saltbush	Atca	05/01	06/15	07/01	08/01	10/01
Shadscale	Atco	03/21	07/09	08/14	09/05	09/30
Mat saltbush	Atcr	05/01	06/15	07/31	08/01	10/01
Nuttall saltbush	Atnu	05/01	06/15	07/01	08/01	10/01
True mountain mahogany	Cemo	05/15	06/15	07/20	08/15	09/10
Rubber rabbitbrush	Chna	04/15	06/20	07/20	11/10	11/20
Winterfat	Eula	03/22	05/15	05/25	06/25	08/01
Bitterbrush	Putr	04/15	06/01	06/15	07/10	09/01
Gambel oak	Quga	05/10	05/23	06/08	10/15	10/30
Mountain snowberry	Syor	05/10	05/28	06/01	10/15	10/30

ticipation. Table 1-4 shows the proposed custodial allotments, including acres of NRL, class of livestock, AUMs, and season of use.

Under custodial management, "The authorized livestock grazing use shall not exceed the livestock grazing capacity and shall be limited or excluded to the extent necessary to achieve the management objectives established for the area" (Federal Register July 28, 1976, p. 31507). Therefore, the kind and number of livestock, the seasons of use, and the grazing areas to be used would be specified. Custodial management would also include trespass control.

Range users (allottees) would be required to continue maintenance of existing range improvements on NRL in a serviceable condition. The allottees would be allowed to construct new range improvements on NRL with prior approval from BLM.

Elimination of Grazing

Elimination of grazing is proposed for nine allotments (covering 3,020 acres, 1 percent of NRL in the ES area) because the areas involved are too steep, are inaccessible, or have other high-priority resource values or because range users in the area affected by the Bureau of Reclamation Dallas Creek project have voluntarily relinquished their privileges.

Elimination of grazing would be accomplished by relinquishment or cancellation of grazing use and would be enforced through supervision and trespass control. Table 1-5 lists the allotments proposed for elimination of grazing and shows the acres of NRL involved and the AUMs to be eliminated.

Continuation of Unallotted Status

Forty-five units, totaling 13,550 acres (3 percent of NRL in the ES area), are not committed to livestock grazing. Under the proposed action they would retain their unallotted, no-grazing status. Supervision would be limited to trespass control.

Benefit/Cost Analysis

Benefit/cost (B/C) analysis has been done for 128 of the 152 allotments under the proposed action. The exceptions are the 9 allotments scheduled for elimination of grazing, the 1 trailing allotment, and the 14 allotments on which AMPs have been implemented or approved for implementation (see tables 1-4 and 1-5). The 56 allotments with AMPs all show a favorable B/C ratio, as do 3 custodial allotments. The remaining 69 allotments, all proposed for custodial management, show a B/C ratio of less than 1/1. Table 1-8 summarizes the B/C analysis. The complete B/C analyses are available for review at the Montrose District Office.

TABLE 1-8.—*Benefit/cost analysis summary*

Benefit/cost with AMPS 1/1 to 2/1	Benefit/cost with AMPs greater than 2/1
28	28
Benefit/cost without AMPs greater than 1/1	**Benefit/cost without AMPs less than 1/1**
3	69

Trespass Control

The proposed action would include a vigorous program for trespass control. Constant surveillance must be made to ensure that the proper numbers of livestock are run in the right areas of use at the proper times. This would ensure proper knowledge that the grazing systems are being adhered to and provide actual use information to evaluate properly the effectiveness of the grazing systems.

Additional Positions

It is assumed that the following four additional full-time positions would be provided: a range conservationist, a range technician, a wildlife technician, and an engineering technician. Additional temporary positions may be needed on a year-to-year basis.

Implementation

Of the 70 AMPs analyzed in the ES, 2 have been in effect for periods up to ten years (5516 Piney and 5521 Highway 90) and 12 were implemented in fiscal year 1975 (4006 Dry Mesa, 4007 Sawmill Mesa, 4008 25 Mesa, 4012 Canal, 4013 Ben Lowe, 4502 Surface to Leroux, 4503 Stingley Gulch, 4528 Oak Ridge, 4529 Reynolds Creek, 4530 McDonald Mesa, 4537 Young's Peak, and 4549 Dry Creek).

The remaining 56 AMPs would be implemented during an eight-year time period, beginning in the year following completion of the ES (1978). The schedule is based on an analysis of predicted increases in funds and manpower. Proposed trailing use, custodial management, and elimination of grazing would be implemented the year following completion of the ES. (The schedule of implementation is shown on table 1-9.)

TABLE 1-9
IMPLEMENTATION SCHEDULE

Already Implemented AMPs
4006 Dry Mesa
4007 Sawmill Mesa
4008 25 Mesa
4012 Canal
4013 Ben Lowe
4502 Surface to Leroux
4503 Stingley Gulch
4528 Oak Ridge
4529 Reynolds Creek
4530 McDonald Mesa
4537 Young's Peak
4549 Dry Creek
5516 Piney
5521 Highway 90

Year 1 (1978)
4011 Lower Roubideau Canyon
4014 Joker
4501 Milk Creek
4505 Juniper Knob
4509 Upper Jay Creek
4514 Upper Terror Creek
4515 Freeman Gulch
4535 Home Place
4536 West Young's Peak
4538 Missouri Flats
5022 Rabbit Gulch
5029 Spring Gulch
5033 Pinyon Springs
5036 Big Gulch
5037 Black Mesa
5039 Onion Valley
5041 East Gould Reservoir
5045 Black Bullet

Year 1 (1978) cont.
5046 Big Gulch
5049 Smith Fork
5050 Allen Reservoir
5503 Green
5505 Transfer
5511 Shavano Mesa
5512 Franklin Mesa
5513 Dry Creek Basin
5518 Dave Wood
5532 Burro Ridge
5533 Onion Lakes
5534 Shin Park
5545 Henshaw
5552 Dallas
5553 Fisher Creek
5555 Taylor Draw
5556 Burro Creek
5557 Alkali
5559 South Fork
5560 Cookie Tree
5562 Hillside
5566 Cow Creek
5569 Hairpin
5572 McKenzie Creek

Year 2 (1979)
4002 Lower Escalante
4005 Fall Cabin
4540 North Saddle Peak
5536 South Canal
5538 Rock Ditch
5543 Waugh
5544 Kelly
5546 Water Dog Basin
5547 Slagle Pass

Note: This implementation schedule assumes availability of funds as appropriated by Congress and achievement of additional positions.

TABLE 1-9
IMPLEMENTATION SCHEDULE (cont.)

Year 2 (1979) cont.
5548 Washboard Rock
5549 High Park
5563 Moonshine Park
5568 Baldy

Year 3 (1980)
4507 Jay Creek
4511 Overland
4516 North Fork
4517 Coal Gulch
5020 Black Ridge
5507 Pipeline
5508 Government Springs
5542 Bosgal

Year 4 (1981)
4024 Dirty George
4504 Leroux Creek
4527 Jumbo Mountain
4532 McDonald Ranch
5502 Sandy Wash
5504 Roatcap
5517 Spring Creek Canyon
5520 Lower Horsefly
5522 Beaver Hill
5530 Billy Creek

Year 5 (1982)
4010 Monitor Mesa
4525 Anthracite Creek
5010 Dead Horse
5011 Gould Reservoir
5012 Cedar Point
5013 Iron Canyon
5014 Poison Spring
5015 Grizzly Gulch

Year 6 (1983)
4001 Dominguez
4022 Petrie Mesa
4025 Ward Creek-Doughspoon

Year 6 (1983) cont.
4512 East Roatcap
5016 Black Canyon
5017 Green Mountain
5529 Log Hill

Year 7 (1984)
4016 Wells Gulch
4017 Alkali Flats
4021 Point Creek
4506 Oak Mesa
4513 Stevens Gulch
4520 Spring Creek
5008 Brush Point
5509 Coal Creek
5540 Dry Gulch

Year 8 (1985)
5002 Dedication Site
5003 Selig Canal
5027 Adobe
5028 Doug Creek
5030 Bostwick Park
5523 Horsefly
5525 Dry Creek
5570 Cedar

Proposed Improvements

The development of thirteen different types of range improvements would be required in order to implement the AMPs: fences, boundary markers, cattleguards, stock trails, pipelines, water taps, vertical wells, horizontal wells, springs, rainfall catchments, reservoirs, water storage tanks, and water troughs. In addition, rangeland vegetation conversion by chaining and reseeding, interseeding, or contour furrowing and reseeding is proposed. These projects were identified in the URAs developed for the ES area and later developed in the AMPs.

Table 1-10 identifies the range improvements for each allotment or allotment subunit. Table 1-11 summarizes the cost of improvements by unit. Maps 1-1 and 1-2, enclosed in a packet that accompanies this ES, show the existing range improvements and the proposed range improvements.

Maintenance

Each year water developments would be periodically inspected to ensure that they are in usable condition, and preventative maintenance would be performed as needed. Fence maintenance would be carried out at five-year intervals. Any repairs requiring actual reconstruction of an improvement would be done by BLM. Normal operational or preventative maintenance required annually or more frequently would be performed by the individual allottees.

General Design Features

The following four design features would be followed when range improvements are constructed in the ES area:

1. Archeological investigation would be required for all project sites prior to new construction.
2. Disturbed area at all project sites would be held to an absolute minimum by pre-construction job layout and by supervision during construction.
3. Neither temporary nor permanent trails or roads would be constructed to fence sites, water developments, or vegetation conversion sites.
4. In order to replace ground cover on the sites, all disturbed areas would be reseeded with a mixture of native or introduced species by the fall of the year that the improvement is constructed. Reseeded areas would be protected from grazing one full growing season and, on chained areas, two full growing seasons.
5. Each project site will be investigated for the presence of rare and endangered plants prior to any disturbance on the site.

FENCES

Fence construction would involve the following steps:

1. The fence lines would be surveyed with the survey being tied to a known reference point (section corners).
2. Stretch panels (two to three wooden posts approximately 6 feet apart with wooden braces between each post) would be constructed at each quarter-mile point along the lines (barbed wire comes in quarter-mile lengths).
3. The top wire would be unrolled and stretched between the panels.
4. The steel posts would be driven approximately 16.5 feet apart.
5. The remaining wires would be unrolled and stretched between the panels.
6. The wires would be attached to each post at a specified spacing (see design features below).
7. Where called for, steel-wire stays would be placed between each post.

Each of these operations would normally require off-road vehicular traffic along the fence (five to ten trips).

In addition, the following design features would be followed:

1. Gray-colored steel posts would be used in constructing fences so that the posts would blend into the landscape.
2. Where fences cross existing roads, either gates or cattleguards would be installed. (All cattleguards would have gates alongside, as described under Cattleguards below.) Use of cattleguards was determined by traffic density; the number and location (by allotment) of cattleguards needed under the proposed action are identified in table 1-10.
3. All new fences would have at least one gate every mile and gates in every right-angle corner.
4. Only hand clearing of the right-of-way would be allowed. The fence would be attached to living trees by placing a 4-foot section of a 2-by-6-inch board between the tree and the wire.

TABLE 1-10
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
4001 Dominguez	40.5 mi.	2.5 mi. Trail	35.0 mi.	6	5	-	6	44	7,445 ac. C&S
4002 Lower Escalante	-	-	-	-	-	-	-	4	-
4010 Monitor Mesa	10.0 mi.	0.5 mi. Trail	3.0 mi.	-	2	10 1 Catchment	1	17	2,045 ac. C&S
4016 Wells Gulch	-	-	19.5 mi.	2	-	-	2	23	-
4017 Alkali Flats	6.0 mi.	-	2.0 mi. 2 Water Taps	-	-	-	-	4	-
4024 Dirty George	3.0 mi.	1 Stock Bridge	-	-	1	1	-	2	-
4025 Ward Creek-Doughspoon	11.0 mi.	-	11.0 mi.	-	1	-	-	16	900 ac. C&S
4504 Leroux Creek	4.5 mi.	0.5 mi. Trail	2 Water Taps	-	5	4	-	19	310 ac. C&S
4506 Oak Mesa:									
G Subunit 1	1.0 mi.	-	-	-	-	-	-	-	300 ac. C&S
H Subunit 2	1.5 mi.	-	-	-	1	-	-	1	200 ac. C&S
4507 Jay Creek	16.0 mi.	-	7.5 mi.	-	4	3	-	18	2,655 ac. C&S
	1 Corral	-	-	-	-	-	-	-	95 ac. IS
4513 Stevens Gulch:									
I Roatcap Creek Subunit	-	-	-	-	-	-	-	-	160 ac. IS
J Terror Creek Subunit	4.0 mi. 2 Cattleguards	-	0.5 mi.	-	3	4	-	8	860 ac. C&S
4516 North Fork	31 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4517 Coal Gulch	-	-	0.5 mi.	-	1	2	-	4	-
4525 Anthracite Creek	0.5 mi.	-	-	-	2	2	-	5	-
4527 Jumbo Mountain	4.0 mi.	1.0 mi. Trail	1.5 mi.	-	1	5	-	8	660 ac. C&S 400 ac. IS

a/ Key to Vegetation Conversion: C&S = chaining and seeding; IS = interseeding; CF = contour furrowing.

TABLE 1-10
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT (cont.)

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
4532 McDonald Ranch	58 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4540 North Saddle Peak	0.5 mi.	-	-	-	-	-	-	-	-
5003 Selig Canal:									
S Selig Canal Subunit	-	-	-	-	-	-	-	-	1,510 ac. IS
5008 Brush Point	-	-	1.0 mi.	1	-	-	1	2	2,555 ac. IS
5010 Dead Horse	3.5 mi.	-	-	-	-	-	-	-	-
5011 Gould Reservoir	-	-	-	-	-	5	-	5	-
5013 Iron Canyon	-	-	-	-	-	5	-	5	-
5014 Poison Spring	-	-	-	-	-	2	-	2	-
5015 Grizzly Gulch	4.5 mi.	-	-	-	-	4	-	4	-
5016 Black Canyon	-	-	-	-	-	-	-	-	80 ac. C&S
5017 Green Mountain	5.5 mi.	-	-	-	-	16	-	16	505 ac. C&S
5020 Black Ridge	7.0 mi.	-	6.0 mi.	-	-	3	1	10	800 ac. C&S
5028 Doug Creek	1.5 mi.	-	-	-	-	-	-	-	-
5030 Bostwick Park:									
U Black Canyon-Jones Draw Subunit	2.0 mi.	-	-	-	-	-	2	2	-
V Adobe South Subunit	5.5 mi. 1 Cattleguard	-	-	-	-	-	-	-	820 ac. CF
5502 Sandy Wash	-	-	8.0 mi.	-	-	-	-	8	-
5504 Roatcap	3.0 mi.	-	6.0 mi.	2	-	-	2	8	-
5507 Pipeline	18.0 mi. 4 Cattleguards	-	22.0 mi.	2	-	3	2	30	-
5508 Government Springs	5.0 mi. 2 Cattleguards	1.0 mi. Trail	-	-	-	6	-	6	-

TABLE 1-10
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT (cont.)

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
5511 Shavano Mesa	-	-	-	-	-	-	-	-	1,120 ac. IS
5512 Franklin Mesa	-	-	-	-	-	-	-	-	1,000 ac. IS
5513 Dry Creek Basin	-	-	-	-	-	-	-	-	1,000 ac. IS
5518 Dave Wood	13 Boundary Posts	-	-	-	-	-	-	-	600 ac. C&S
5520 Lower Horsefly:									
X Lower Horsefly Subunit	-	0.5 mi. Trail	2.0 mi.	2 (1 Horizontal)	1	1	2	8	670 ac. C&S 825 ac. IS 430 ac. CF
5522 Beaver Hill	10 Boundary Posts & Signs	-	7.5 mi.	3	-	-	3	11	150 ac. C&S
5523 Horsefly	3.0 mi.	-	-	-	-	3	-	-	400 ac. C&S
5529 Log Hill	5.0 mi. 1 Cattleguard	-	3.5 mi.	1	-	-	1	4	2,300 ac. C&S
5530 Billy Creek	2.0 mi. 2 Cattleguards	-	-	-	-	5	-	-	-
5540 Dry Gulch	4.0 mi.	-	-	-	-	-	-	-	-
5562 Hillside	1.0 mi.	-	0.5 mi.	-	-	1	-	2	-
5568 Baldy	-	-	-	-	1	1	-	2	-
5570 Cedar	7.0 mi.	-	2.0 mi.	-	1	-	-	2	-
TOTALS	180 mi. fences 112 boundary markers 12 cattleguards 1 corral	6 mi. trail 1 stock bridge	139 mi. 4 water taps	18 vert. 1 horiz.	29	86	23	300	20,880 ac. C&S 8,665 ac. IS 1,250 ac. CF

TABLE 1-11
PROPOSED IMPROVEMENTS: SUMMATION OF DATA

Range Improvement	Unit	Total	Cost Per Unit ($)
Fences	Mi.	180	2,390/mi.
Boundary Markers	No.	112	5/ea.
Cattleguards	No.	12	1,435/ea.
Corrals	No.	1	2,000/ea.
Stock Bridges	No.	1	2,000/ea.
Stock Trails	Mi.	6	690/mi.
Water Developments:			
Pipelines	Mi.	139	2,415/mi.
Water Taps	No.	4	750/ea.
Vertical Wells	No.	18	14,830/ea.
Horizontal Wells	No.	1	14,830/ea.
Storage Tanks	No.	23	2,915/ea.
Catchments	No.	1	16,000/ea.
Reservoirs	No.	86	1,000/ea.
Springs	No.	29	800/ea.
Troughs	No.	300	200/ea.
Vegetation Conversion:			
Chaining & Seeding	Ac.	20,880	15/ac.
Interseeding	Ac.	8,665	10/ac.
Contour Furrows	Ac.	1,250	30/ac.

Note: Information on acres disturbed and total cost by project component can be found under Assumptions and Analysis Guideline at the beginning of chapter 3.

5. Division fences (pasture and boundary) would be built with barbed wire, except on antelope range where the bottom strand would be smooth wire to allow for movement of big game. (A total of 20 miles of antelope fence are proposed on three allotments—4017 Alkali Flats, 4024 Dirty George, and 4025 Ward Creek-Doughspoon.) Fences may consist of three or four strands, as determined by need and identified in the AMPs.

6. For three-wire fences, the following spacing would be used for the fence wires: bottom wire, 16 inches above the ground, and top wire, 38 inches above the ground.

7. For four-strand fences, the following spacing would be used: bottom wire, 16 inches above the ground; second wire, 24 inches; third wire, 30 inches; and top wire, 42 inches.

Figures 1-2 and 1-3 illustrate typical fences.

BOUNDARY MARKERS

Boundary markers would be used to identify unfenced allotment and pasture boundaries. These allotments would be grazed by sheep controlled by herders, and the boundary markers would provide the herders with specific instructions as to which pastures would be rested and which pastures would be grazed.

Steel posts, measuring 5.5 feet, with a 6-by-8 inch marker, would be driven into the ground on the boundaries (see figure 1-4). The distance between posts would be based on line of sight, but would not exceed 0.25 mile. These markers would be installed by BLM employees accompanied by the range user.

CATTLEGUARDS

Cattleguard construction would involve the excavation of a hole approximately 8 feet wide, 11 feet long, and 24 inches deep. A precast concrete base or treated timber base would be set into the excavation, and earth would be backfilled and compacted around it so that a pit would remain in the middle of the base. A metal grid—with openings large enough to keep animals from walking across, but small enough to allow vehicles to drive over—would be set onto the base so that the grid would not move. Cattleguards would be painted a color that would blend with the surrounding landscape. (See figure 1-5.)

A gate would be placed to one side of the cattleguard to allow movement of livestock through the fence. In addition, extremely heavy loads or wide loads could be taken through the gate rather than over the cattleguards, which would be built with a 15- to 20-ton limit.

STOCK TRAILS

To provide livestock access to inaccessible areas and to facilitate pasture moves of livestock, 6 miles of stock trails would be constructed. The trails would be constructed with a crawler tractor, along lines flagged by an engineer to the grade desired and an average width of 8 feet. All trails would have waterbars and turnouts for runoff. They would be closed to vehicular traffic by waterbars at each end. All disturbed areas, including the trail itself, would be seeded with grass to stabilize the soil. The seeding would be carried out the fall following construction.

PIPELINES

Pipelines (see figure 1-6) would be needed to carry water from a source (well, stream, spring, reservoir, or catchment) to an area where water is not now available to livestock and wildlife.

For a pipeline, 1.25-inch diameter plastic pipe (125 pounds per square inch) would be used. The pipe-laying device would be a "ripper tooth," mounted on a tractor. The tooth would be less than 4 inches wide with a forward curve which would help hold the end of the tooth at the desired depth. A shoe of 3 to 4 inches in diameter would be welded to the backside of the ripper tooth and would curve outward from the tractor. A pipe roll holder would be mounted on the tractor and the pipe would be threaded through the pipe shoe on the ripper tooth.

The pipe would normally be laid from 18 to 30 inches under the ground, depending upon where rock was found. The end of the plastic pipe would be anchored, and the tractor would lower the ripper tooth, move forward, and feed the pipe into the ripped channel. As the tractor moves forward, the earth would settle back around the pipe so that a visible rise of 4 inches or less, with a varying width (generally less than 2 feet), would be the only remaining disturbance except for the tracks made by the tractor. In some instances, a backhoe trencher or blasting would be used to prepare the trench for the pipeline. Construction would be by contract.

For pipeline installations, no right-of-way clearing or road construction would be permitted except for the removal of an occasional tree that could not be bypassed. Disturbed areas along

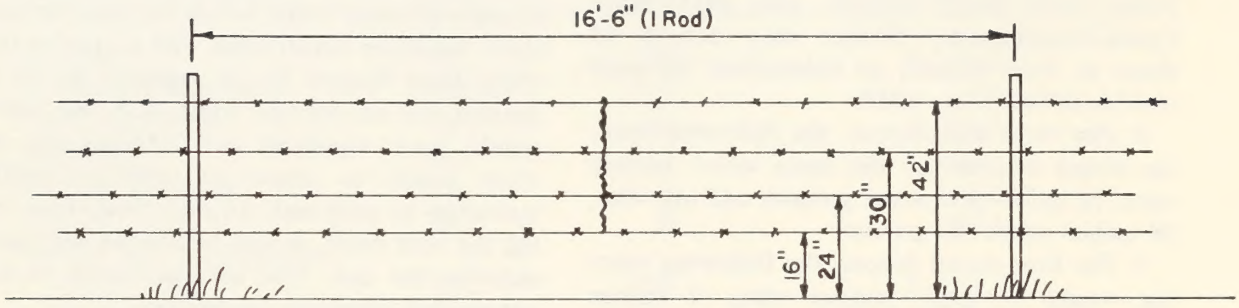


Figure 1-2. Standard Four Strand Range Fence

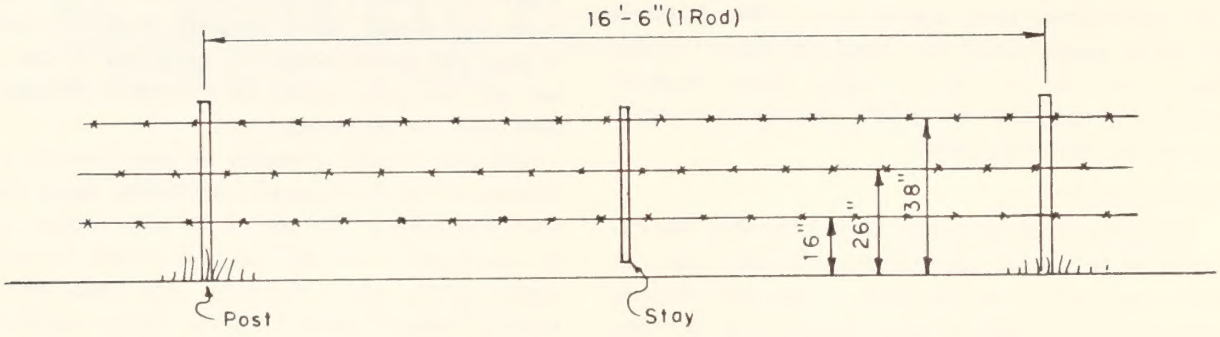


Figure 1-3. Standard Three Strand Range Fence

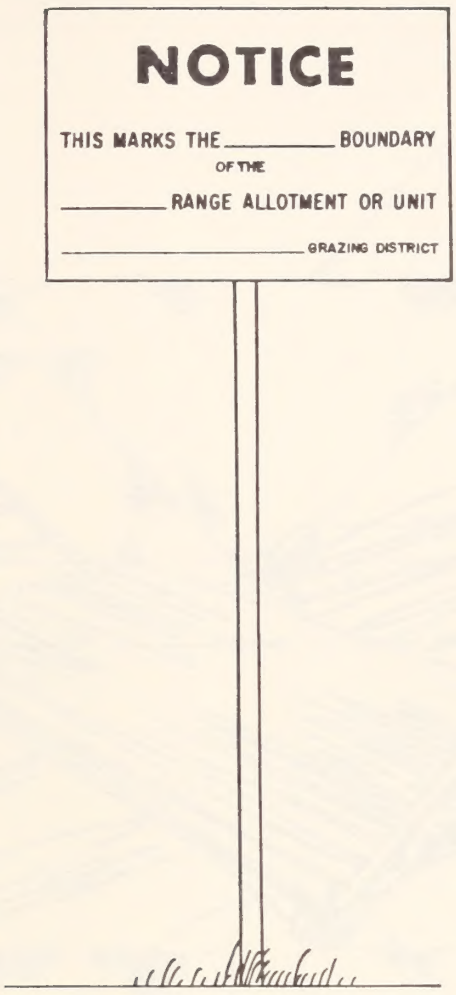


Figure 1-4 Boundary Marker

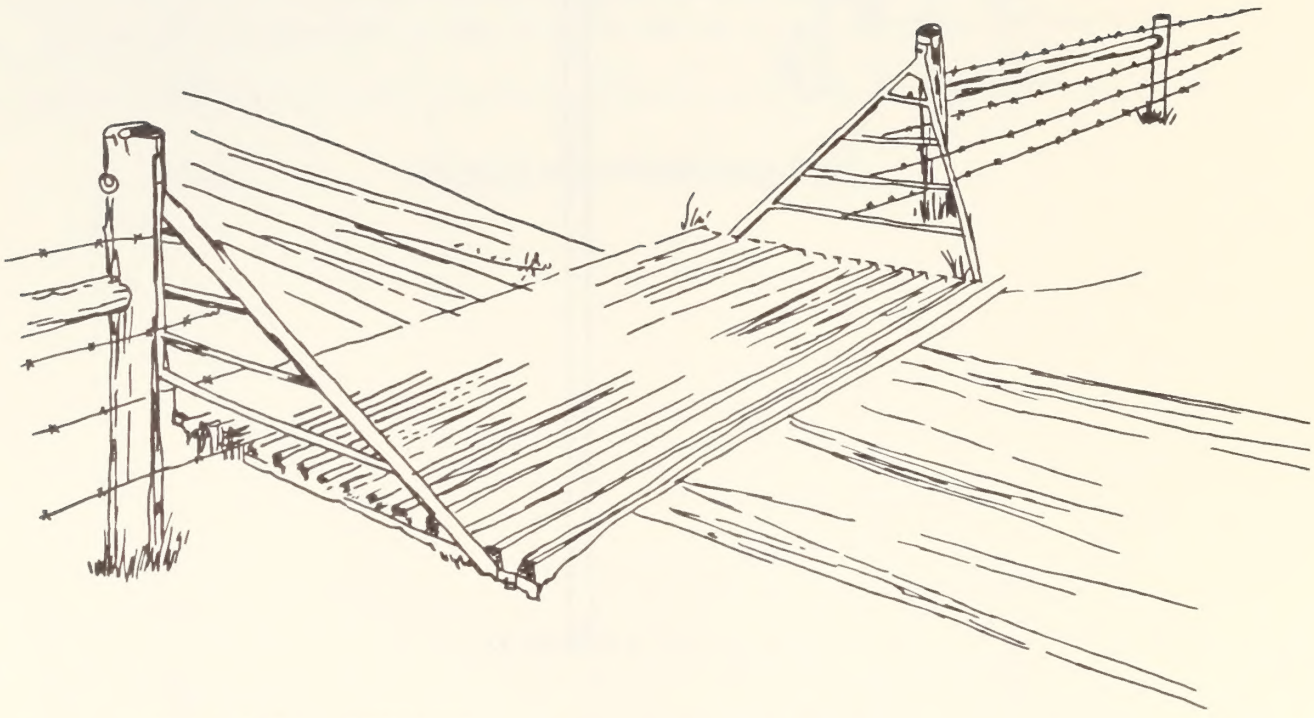


Figure 1-5. Cattleguard

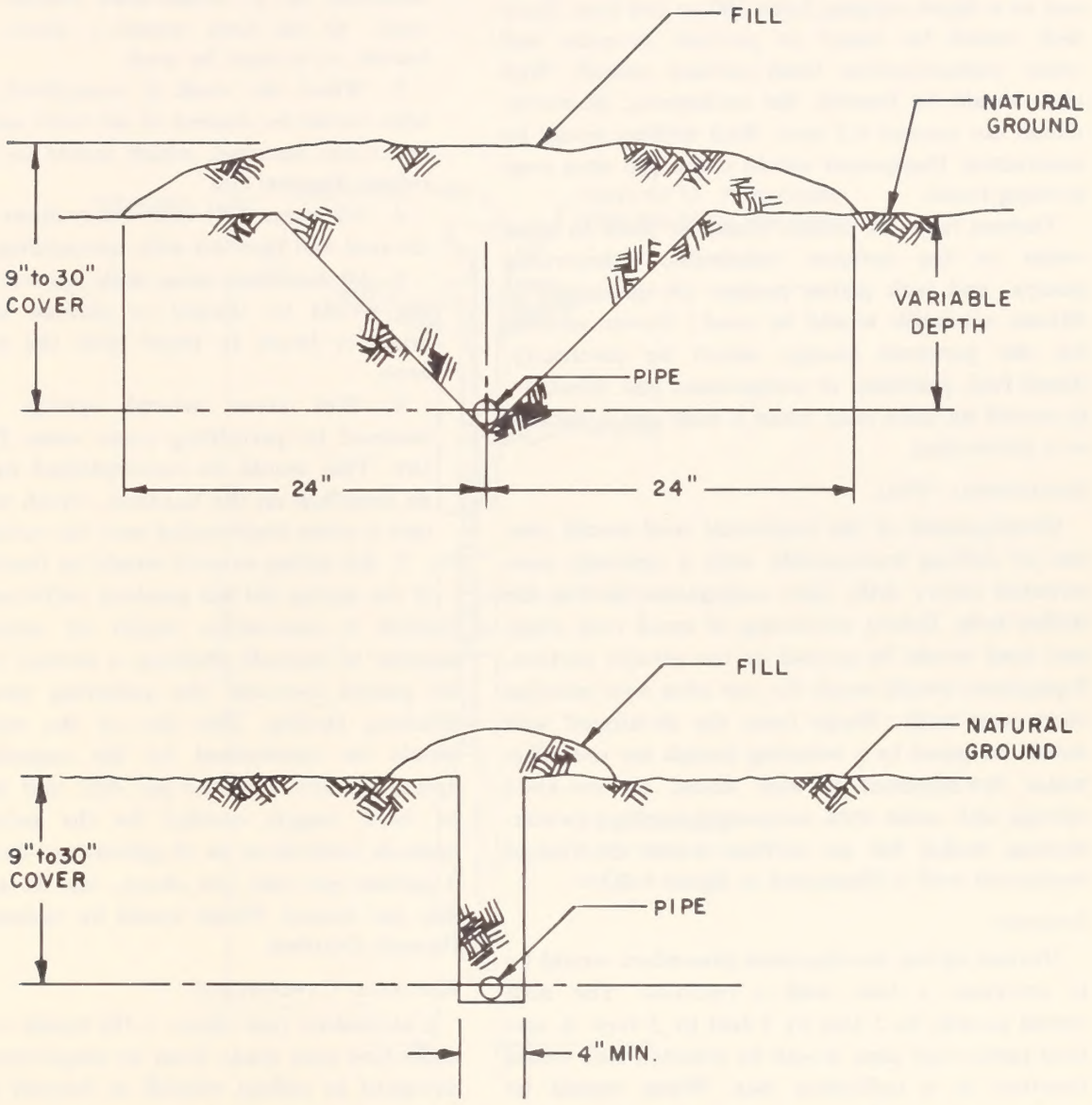


Figure 1-6. Pipeline

pipelines would be revegetated with native species when available.

VERTICAL WELLS

Vertical wells (see figure 1-7) would be constructed by drilling a hole with a cable tool or rotary drill to a diameter ranging from 4 to 8 inches and to a depth ranging from 100 to 800 feet. Each well would be cased to prevent cave-ins and water contamination from surface runoff. Well sites would be fenced; the enclosures, however, would not exceed 0.5 acre. Well drilling would be contracted. Equipment would reach job sites over existing roads.

Various types of pumps would be used to bring water to the surface: windmills, submersible pumps, and jack piston pumps. (A maximum of fifteen windmills would be used.) Power sources for the powered pumps would be electricity, diesel fuel, gasoline, or compressed gas. Electricity would be used only when a well site is located at a power line.

HORIZONTAL WELL

Development of the horizontal well would consist of drilling horizontally with a specially constructed rotary drill, then casing and sealing the drilled hole. Debris consisting of small rock chips and sand would be spread on the ground surface. Equipment would reach the job sites over existing roads and trails. Water from the developed well would be piped to a watering trough for use. This water development is well suited to low-yield springs and areas with suspected aquifers (water-bearing rocks) but no surface water. (A typical horizontal well is illustrated in figure 1-8.)

SPRINGS

Normal spring development procedure would be to excavate a hole with a backhoe. The hole would usually be 5 feet by 5 feet by 5 feet. A vertical perforated pipe would be inserted and would function as a collection box. Water would be piped in a small-diameter (generally 1.25 inches) plastic pipe from the box to the trough. For sites where the water seeps from a larger area, the gathering devices would be perforated pipes horizontally trenched in the seep. Water would be moved by pipe from the gathering device to a vertical headbox from which it would be piped into the trough. Equipment would reach the job site over existing roads or trails. (A typical spring development is shown in figure 1-9.)

The following design features would be followed for spring development:

1. Actual development work on and around the spring would be done with hand tools as much as possible.
2. Where machinery is needed, a backhoe mounted on a rubber-tired tractor would be used. At no time would a dozer, front-end loader, or scraper be used.
3. When the work is completed, the work area would be cleared of all trash and damaged or excess material, which would be taken to a refuse disposal site.
4. All cuts, fill, and excavations would be dressed and blended with surrounding area.
5. All disturbed areas with mineral soil showing would be seeded or planted with native grass or brush to blend with the undisturbed area.
6. Wet areas around springs would be retained by permitting some water flow at the site. This would be accomplished by installing an overflow on the headbox, which would drain into a sump constructed near the spring source.
7. All spring sources would be fenced.

If the spring did not produce sufficient water to furnish a continuous supply of water for the number of animals drinking, a storage tank would be placed between the gathering box and the drinking facility. The size of the storage tank would be determined by the capacity of the spring, gallons required per day, and the number of days' supply needed for the safety of the animals (calculated as 10 gallons per day per cow, 3 gallons per day per sheep, and 12 gallons per day per horse). Water would be maintained May through October.

RAINFALL CATCHMENTS

Catchments (see figure 1-10) would consist of a collection area made from an impervious material designed to collect rainfall or located on natural slick rock (geologic) formations, a storage facility, and pipelines to a drinking facility for the animals.

The size of the collection area and the storage facility would be determined by average annual rainfall and water requirements. For example, a 100-foot-square collection area that would receive a 9-inch annual average rainfall would yield 56,200 gallons of water per year. Each job would be designed for the needs of the specific site. A fence, generally enclosing 1 acre or less, would be

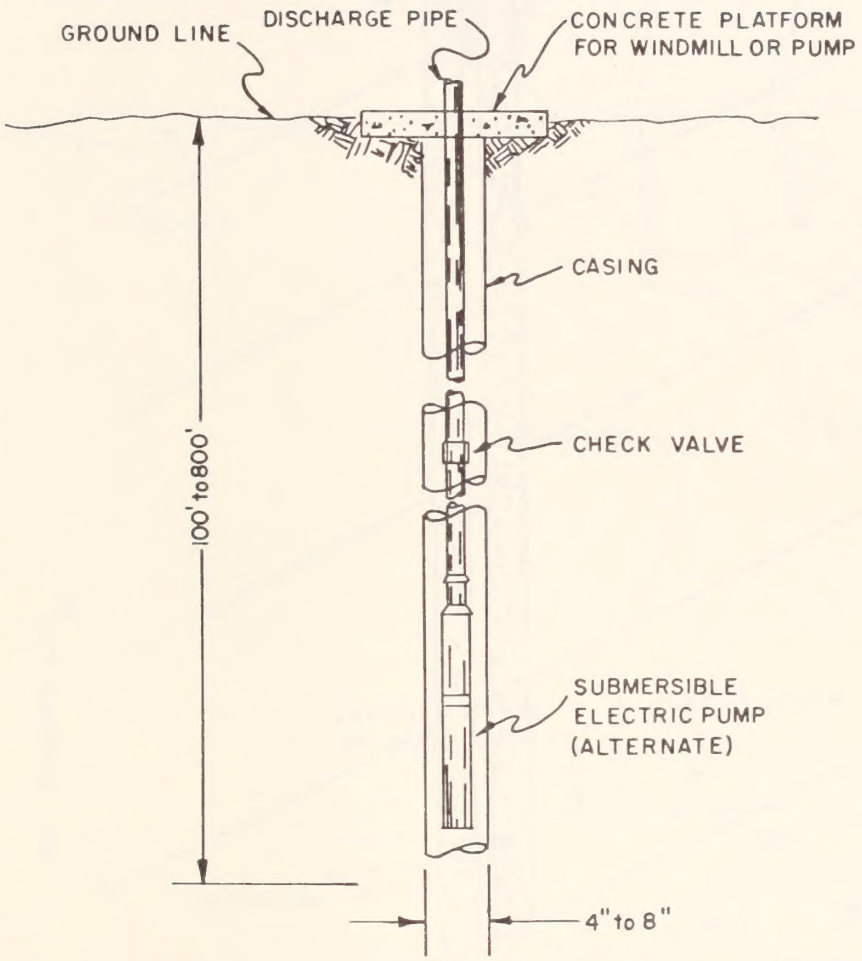


Figure 1 - 7. Typical Vertical Water Well

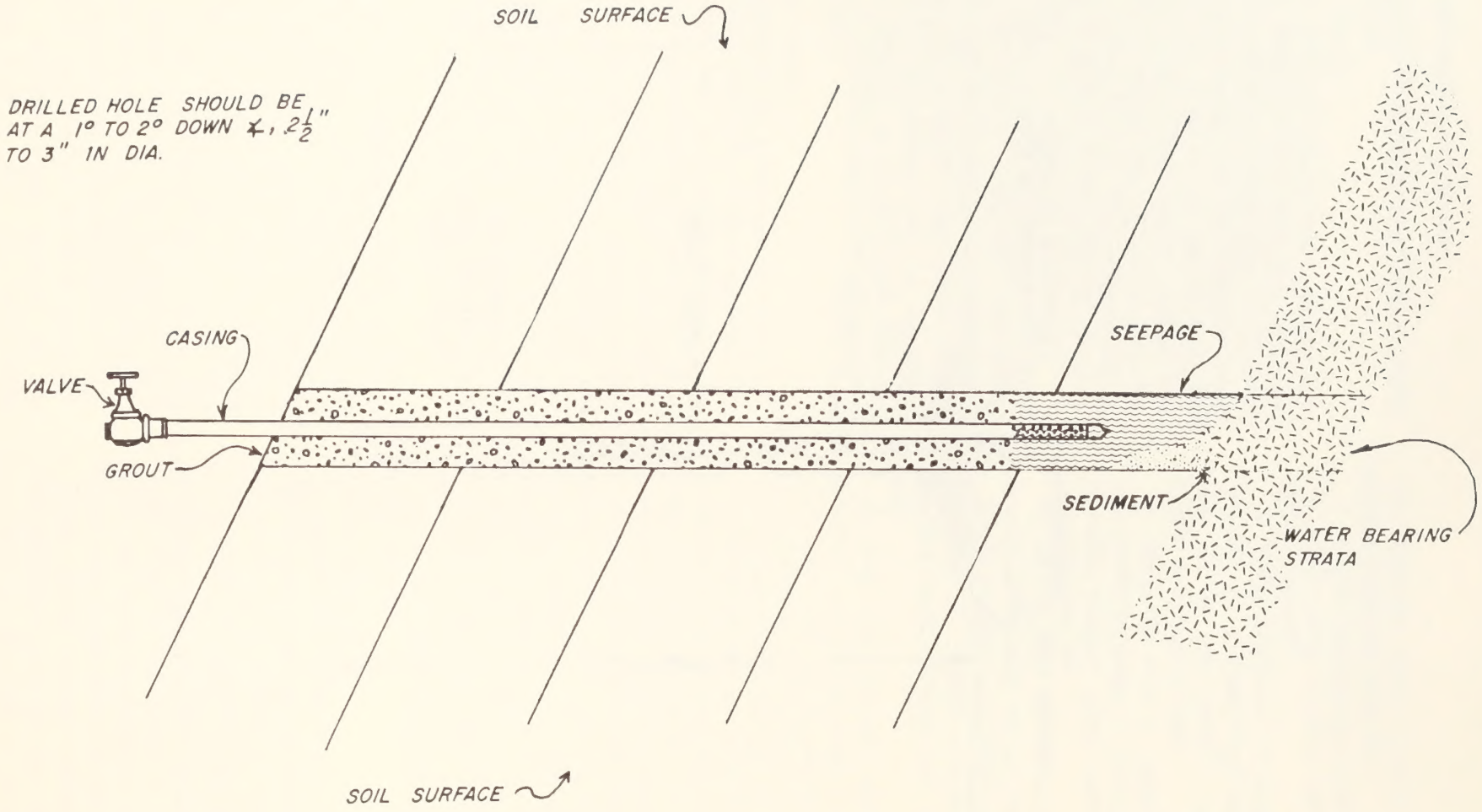


Figure 1-8. Typical Horizontal Well

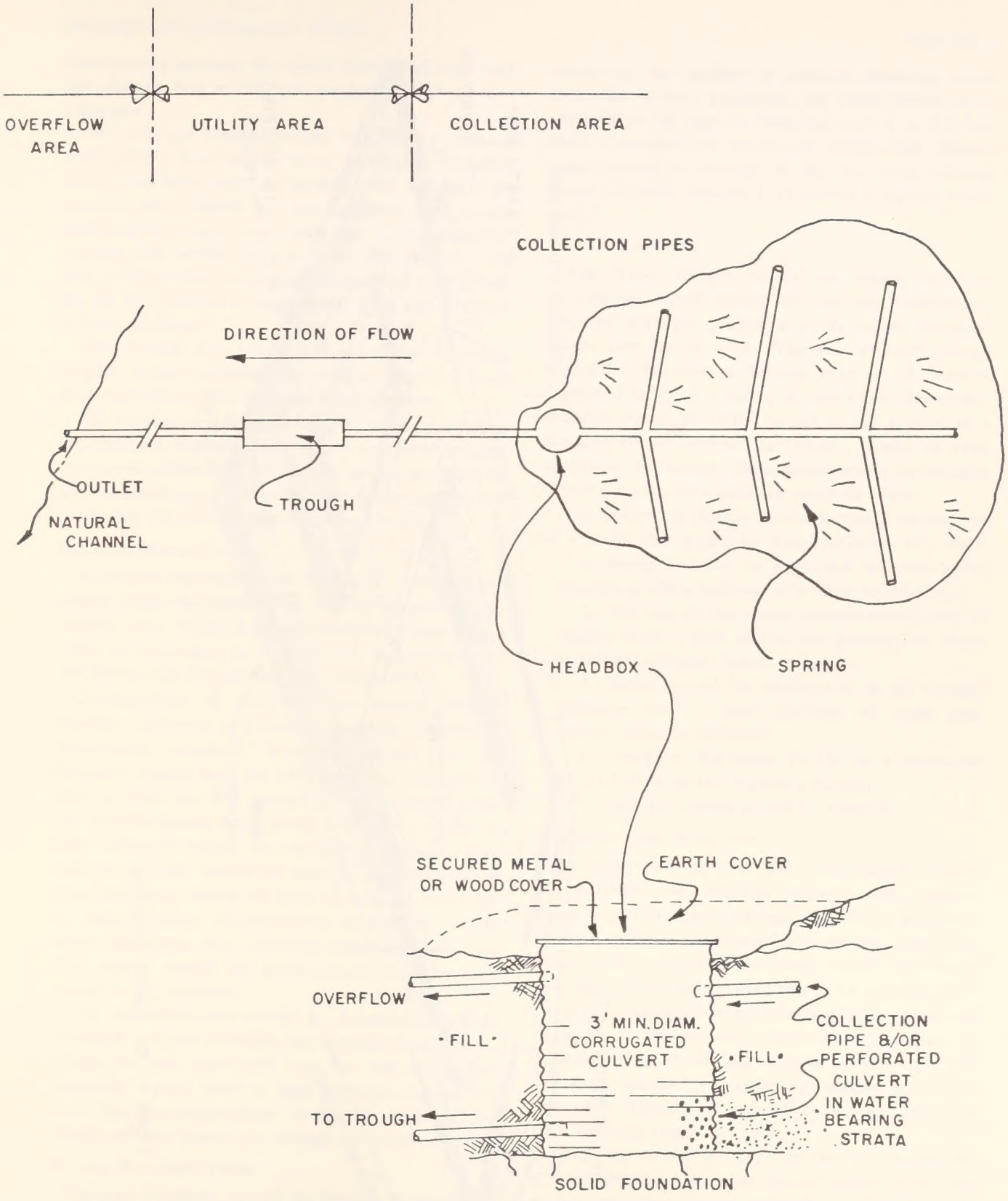


Figure 1 – 9. Developed Spring

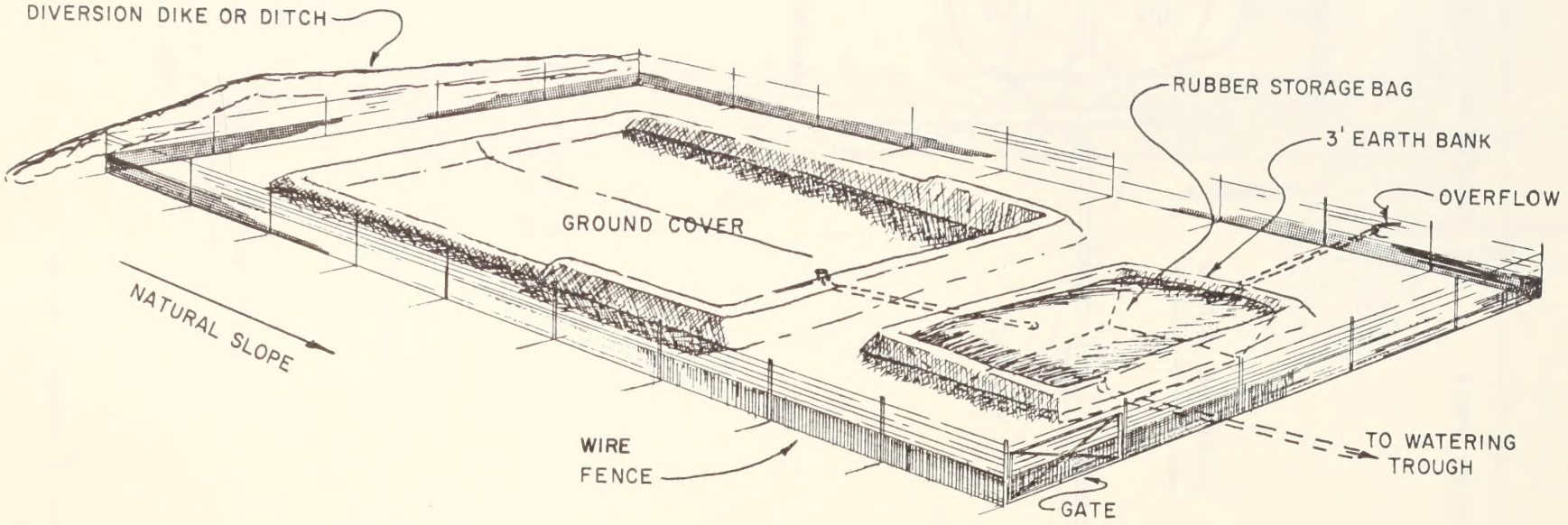


Figure 1 - 10. Rainfall Catchment

constructed around the water collection area and the storage bag in order to exclude livestock and big game.

The storage facility would usually be a large butyl rubber bag, placed in an earthen pit (cradle) which had been dug and shaped with a track-type tractor and cleared of any objects that could puncture the bag. The cradle for a 50,000 gallon storage bag would be less than 150 feet by 150 feet, with earthen banks approximately 3 feet high on all four sides to support the bag and prevent it from moving.

The trench for the pipeline to the watering trough would normally be dug by backhoe and then backfilled after the pipe was inserted.

All vegetation scraped from the water collecting area and the bag cradle would be scattered around the construction site. Reseeding would be done on all disturbed areas. Construction equipment would reach the site on existing roads and trails.

EARTHEN RESERVOIRS

Detention reservoirs (see figure 1-11) would impound water throughout the year for livestock and wildlife use. Water storage capacity would range from 0.5 acre-foot to 1 acre-foot (approximately 163,350 to 326,700 gallons per reservoir).

Construction of the reservoir would involve digging a keyway and backfilling with compacted impervious material. Repeated layers of fill material would then be added as the impervious core is built up. Fill materials would come from the impoundment area (pool areas) or a borrow area. Topsoil would be stockpiled close to the borrow pits and would be used to rehabilitate the pits. Bentonite would be used to seal the reservoir to stop seepage. Construction equipment would reach the sites over existing roads or trails; no new roads would be constructed. Construction would be by contract.

The reservoir area would be fenced to exclude livestock but not wildlife; the average fenced area would be less than 300 feet by 300 feet. The reservoir would have a pipe installed under the dam during construction to allow water to be drawn off and piped to a trough for livestock use.

WATER STORAGE TANKS

Storage facilities would be placed at predetermined areas, and a pipeline would be attached to them. These facilities would be made out of metal and painted a color that would blend with the surrounding landscape. Their size would be determined by the number of animals requiring water from the source; generally, the tanks would measure 15 to 30 feet in diameter and 6 to 12 feet high. Construction would be contracted. Equipment would be brought to the site over existing roads or trails. (Figure 1-12 shows a typical water tank.)

WATER TROUGHS

The water troughs would be round tanks or rectangular metal boxes of varying lengths associated with the proposed water supply developments (see figure 1-13). The size of each trough would be determined by the number of animals expected to drink from it at one time. Generally, wooden posts, partially buried in the ground in a wooden frame around the trough, would be used to steady the trough. Equipment would be brought to the job site over existing roads or trails.

The following design features would be met on all troughs that would be installed in the ES area:

1. Ramps would be provided in each water trough to allow animals and birds to escape.
2. The top of the water trough would not be higher than 2 feet above the ground, to allow antelope and deer fawns to water.
3. Water would be maintained in all troughs between May 1 and October 30 each year where water is available.
4. Overflow discharge would be a minimum of 50 feet from the watering facility.
5. Overflow areas would be fenced.

CHAINING AND RESEEDING

A heavy (90 pounds per link) ship's anchor chain would be attached between two crawler tractors and dragged through mature or decadent, closed canopy pinyon-juniper stands, knocking down and uprooting the trees. After the initial one-way chaining, aircraft would be used to seed the area with suitable grasses and forbs. A second chaining in the opposite direction would then be applied. This rechaining would ensure tree kill, break up the debris into smaller pieces, and cover the seed. Equipment would reach the job sites over existing roads or trails.

Chaining would be done in the fall before the ground freezes, so that the adapted grass and browse species can be properly seeded. Pastures which contain chained areas would be rested from grazing for two full growing seasons after chaining to allow for establishment of the seedlings. The chained brush would be left in place and not

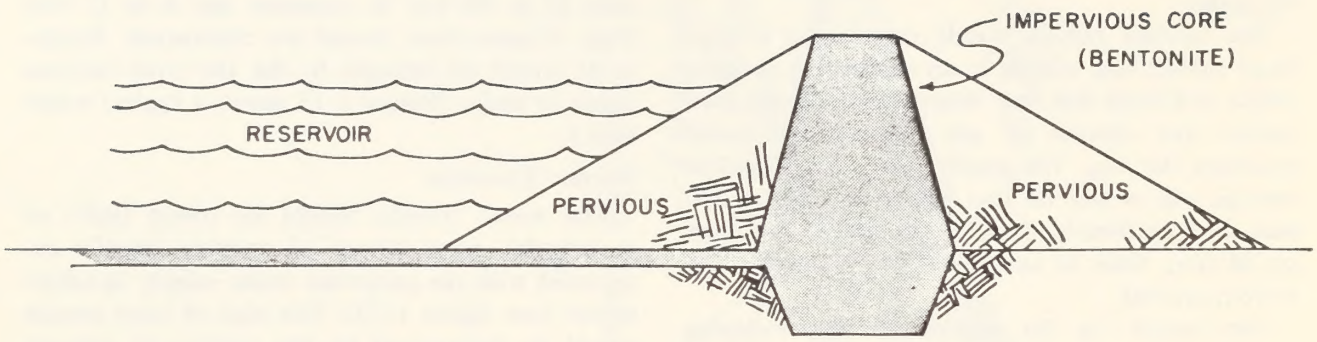


Figure 1-11. Typical Reservoir

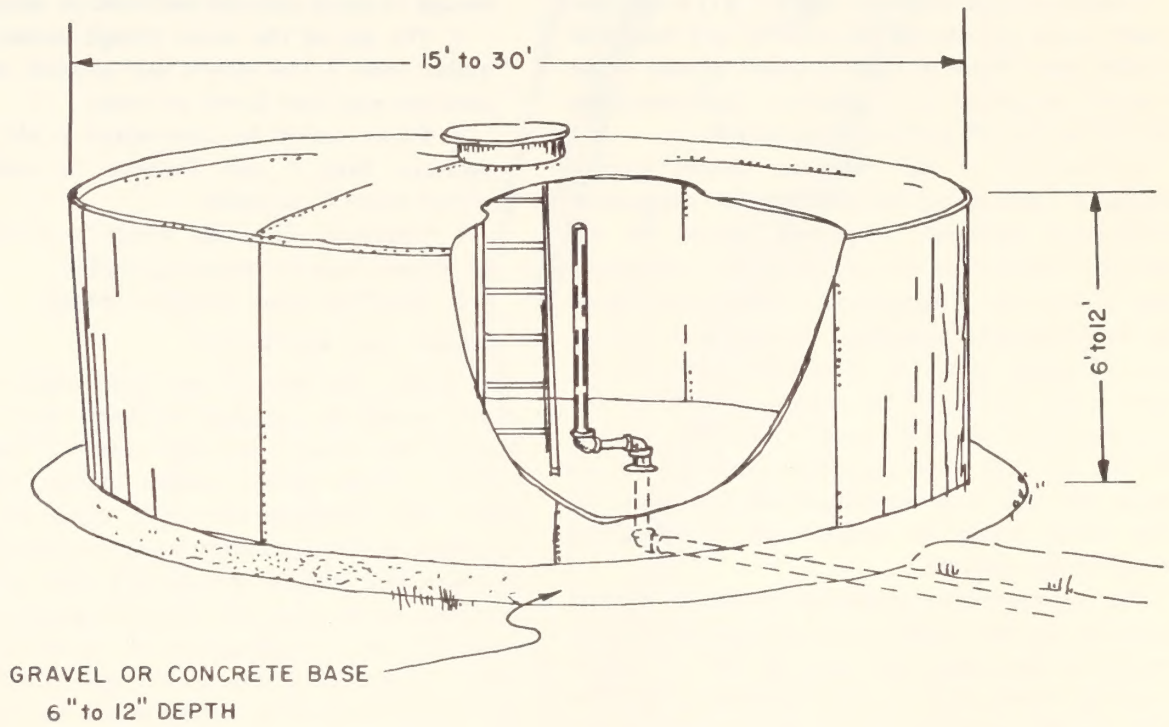


Figure 1-12. Typical Water Tank

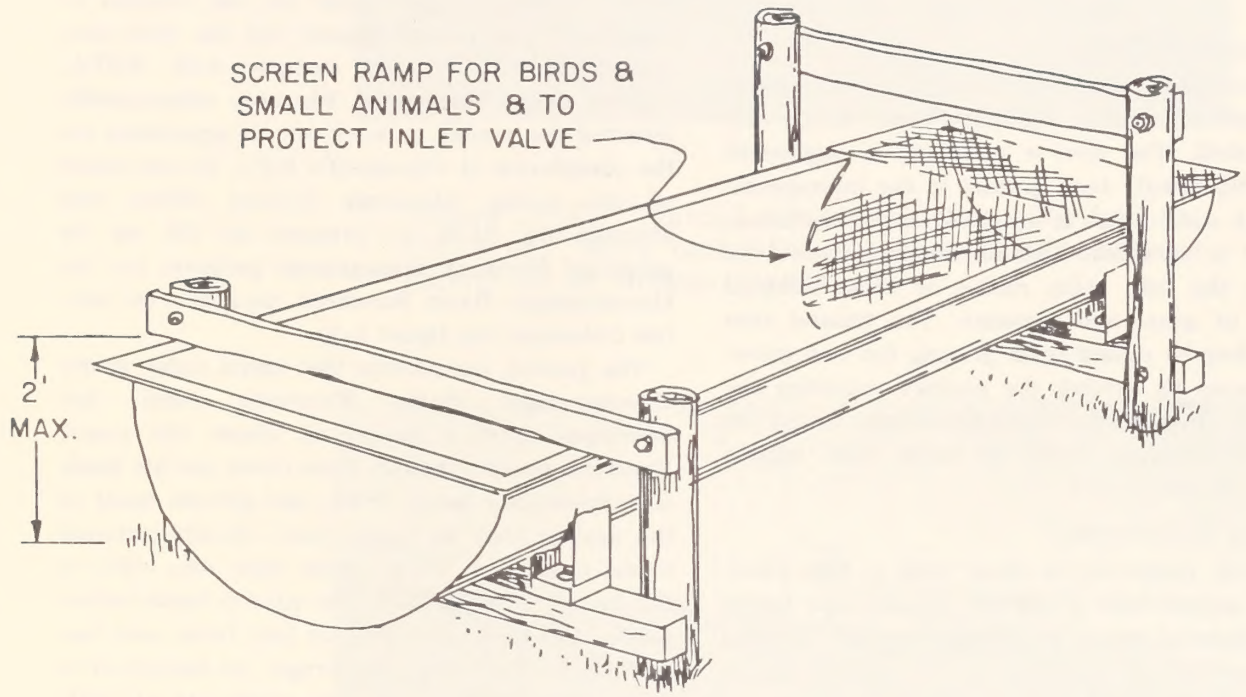


Figure 1-13. Water Trough

windrowed. In most cases, the pinyon pine would be sold for firewood.

Areas to be chained would be carefully designed so that straight line effects would not be left, and chainings would conform as nearly as possible to the surrounding terrain. Scenic strips about 200 feet wide would be left along roads to screen the chained areas from view. Leave strips about 100 yards wide would be left for wildlife cover and protection, and runs or steep drainages would be left unchained. Buffer strips about 200 feet wide would be left along streams. (Figure 1-14 shows a typical pinyon-juniper site before chaining; figure 1-15 shows a typical chained area.)

INTERSEEDING

Interseeding involves drilling grass and legume seeds into an existing vegetative stand with a rangeland drill. The site is generally a sagebrush stand with mostly bare ground in the interspaces. Although some brush is uprooted in the operation, most of it survives. The interseeding would be done in the fall, using native or other adapted species of grass and legumes. The treated area would then be rested from grazing for two growing seasons by resting the pasture receiving the treatment. Equipment would be brought to the job site over existing roads or trails. (See figures 1-16, 1-17, and 1-18.)

CONTOUR FURROWING

Contour furrowing is done with a disk plow, usually pulled with a crawler tractor (see figure 1-19). Plowing would be on the contour, opening a shallow trench from 20 to 30 centimeters in depth and 50 to 75 centimeters wide. Trenches would be spaced approximately 1.5 meters apart. An attached apparatus would make small check dams in the furrow at approximately 1.2 to 6.2 meter intervals. Adapted species of plants would usually be seeded at the same time because of the cover removed by the plow. Equipment would be brought to the job site by existing roads or trails.

INTERRELATIONSHIPS

This section provides information on the history and background of the ES area and the relationship between the proposed action and BLM's planning program, including the energy minerals program. Also included are projects or management practices of four other federal or state agencies: U.S. Bureau of Reclamation (USBR), U.S. Forest Service (USFS), Colorado Division of Wildlife (DOW), and the Environmental Protection Agency (EPA).

History and Background

BLM published, in January 1975, a final programmatic ES which analyzed the impacts of BLM's livestock grazing management program on NRL as a whole. This programmatic ES was issued in compliance with section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 (42 USC 4327).

In October 1973, several conservation groups filed a lawsuit against the U.S. Dept. of the Interior in Federal District Court for the District of Columbia. The groups argued that the draft programmatic ES did not comply with NEPA. Federal Judge Thomas A. Flannery subsequently directed the parties to work out an agreement for the completion of site-specific ES's. As one result of this ruling, Montrose District Office was directed by BLM to prepare an ES on its proposed livestock management program for the Uncompahgre Basin Resource Area in west central Colorado (see figure 1-1).

The grazing use pattern that exists today in the Uncompahgre Basin Resource Area has developed over a period of about 100 years. Ranchers move livestock from lower private lands to intermediate lands (NRL and private land) in the spring; then to higher land, usually national forest lands, for the summer; then onto NRL in the fall; and finally back onto private lands before winter to utilize regrowth on hay fields and hay as the primary sources of forage. An exception to this general pattern is winter sheep use of NRL on the Uncompahgre Plateau and other areas.

In the mid-1950's, the need for more appropriate stocking rates for individual allotments became obvious. As a result, range surveys or forage inventories were initiated on several grazing units in order to determine proper rates for various allotments. These surveys continued intermittently through 1968. Stocking rates were reduced on very few allotments of the ES area and only with the complete cooperation of the operator. On some allotments, stocking rates were negotiated by BLM and the permittee without any range survey data.

During the past ten years, BLM management policies have been directed toward intensifying range supervision through allotment management

Figure 1-14. Typical pinyon-juniper site before chaining. Note lack of herbaceous cover and poor condition of browse plants.

Figure 1-15. Pinyon-juniper chaining on the Uncompahgre Plateau. These chainings were done prior to the multiple-use guidelines for size of area and leave strips.

Figure 1-16. An area on Sims Mesa prior to interseeding. Grass species made up less than 2 percent of the ground cover before seeding.

Figure 1-17. Area on Sims Mesa immediately after interseeding. Drill rows can be seen between sagebrush plants. Only about 5 percent of sagebrush is killed from this operation.

Figure 1-18. Interseeded area on Sims Mesa two years after seedings showing the increase in grasses. Deer use increased greatly after seeding.

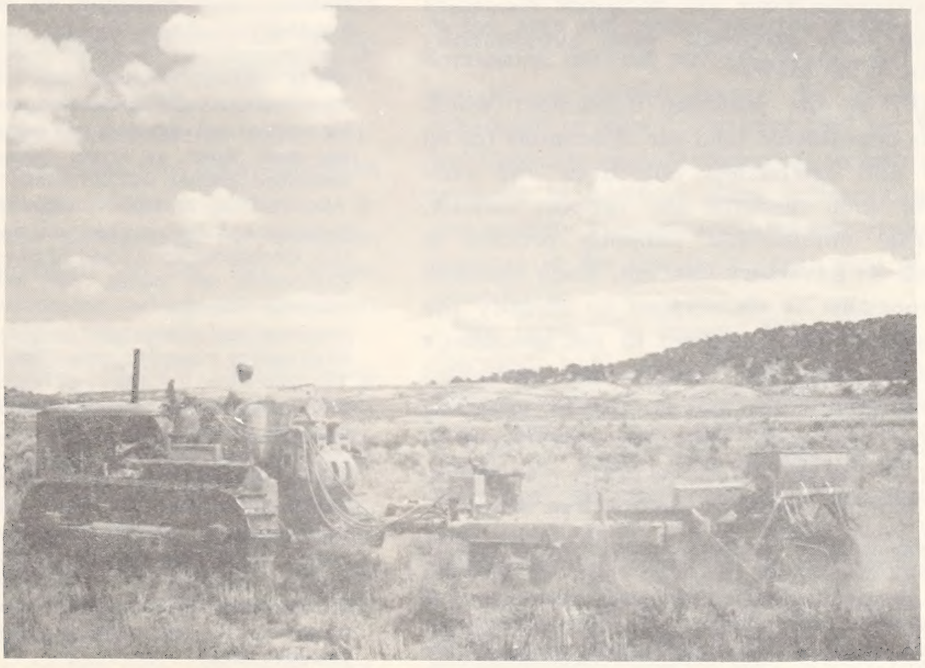


Figure 1-19. Contour furrowing machine in action. Note the seed box on back of machine for seeding grasses, forbs, and browse. This operation is used to reduce runoff so that seedlings can become established.

plans, adjusting class of livestock, livestock numbers, or season of use in consideration of other resource values.

Planning Goals

There is a direct relationship between the proposed action and BLM's planning process. This planning process is guided by the basic resource inventory data called unit resource analyses (URAs) and by management decisions developed in the management framework plans (MFPs).

The URA is a summarized and coordinated resource inventory prepared in the detail needed for multiple-use planning. A URA is prepared on planning units, which are the basic geographic units used by BLM to aggregate resource data. There are four planning units in the ES area: North Fork-Alkali, Escalante, Cimarron, and Gunnison Gorge. All of the URAs, with the exception of the Escalante URA, were updated in fiscal year 1976. The URAs developed for these four planning units indicate present and potential livestock grazing within the resource area (ES area). Recommendations and decisions necessary to develop such proposals were subsequently worked out in the MFPs.

The MFP is the planning instrument which establishes coordinated land use allocations for all resources and establishes objectives and constraints for each resource and support activity. The internal multiple-use planning process is based upon an adversary concept. Each resource activity specialist is encouraged to identify the full potential of the resources in the specialist's area. The overlaps and conflicts are reconciled through extensive study and discussion, including public input. The major objectives established by the MFPs for the key resources in the Uncompahgre Basin planning units are summarized below.

1. Initiate administrative or other actions to further stabilize the livestock industry and encourage input and interest in long-term planning and management. Upon completion of an environmental statement, implement 79 AMPs with full grazing systems designed around the key species concept for improvement of range conditions. Administrative actions on small allotments not identified for AMPs could include (1) change in class of livestock, (2) change in season of use, and (3) adjustment in use where applicable to improve range condition, meet forage production goals, and aid in stabilizing use. Provide forage for 40,532 animal unit months of Class I qualifications on a sustained yield basis in the Uncompahgre Basin Resource Area.
2. Specific recommendations for wildlife are as follows:
   a. Develop grazing management systems.
   b. Change winter grazing of livestock to spring-early summer grazing when or where necessary to protect wildlife winter range.
   c. Do not increase livestock pressure during fall, winter, or early spring on those browse species found, by the inventory and analysis, to be critical to wildlife.
   d. Determine the suitability of the area west of the Gunnison River for antelope range and the influence of an established herd on nearby farms. Maintain close liaison with Colorado Division of Wildlife (DOW) on any such proposals.
   e. Design all fences so they will not restrict big game movements: 42 inches maximum height, 16 inches bottom clearance.
   f. The recommendation for Western Delta County is to maintain a status quo pending forage and deer herd studies. These recommendations were considered by the staff range specialist, wildlife biologist, and area manager when determining specific objectives for each AMP. Their purpose was to manage the unit to provide high quality big game habitat for deer, antelope, and elk; provide habitat for maintenance of present population of upland game birds and improve habitat for waterfowl populations; protect and improve game fish habitat; and protect and enhance habitat for threatened species.
3. For watershed (soil and water resources) reduce the current rate of accelerated erosion where condition classes are worse than slight. Specific recommendations to accomplish this objective are (1) coordinate all watershed proposals with other activities, (2) apply district chaining guidelines to all chainings, leaving islands and buffer strips, (3) apply vegetative manipulation or other watershed tillage to approximately 15,200 acres of NRL, (4) conduct hydrologic, soil, and erosion studies throughout the area, and (5) implement livestock management systems.
4. Recommendations for timber resources are (1) continue the sale of woodland products when it does not adversely affect other resources and (2) develop plans for harvests of standing trees to accommodate and enhance other values, including such things as hunter campsites, recreation areas, watershed, grazing, wildlife habitat, and access.
5. Allow no strip or auger mining on new leases for coal. Exploration and mining plans are reviewed and approved by U.S. Geological Survey and BLM prior to any development. Exploration and mining roads will be located so as to minimize damage to valuable watershed areas, water resources, and management facilities. (See also discussion of BLM energy minerals program below.)
6. For recreation, if studies and hearings indicate that the Little Dominguez area is suitable for primitive status, it will be managed accordingly.
7. Specific lands objectives necessary to coordinate the range activity are as follows: (1) all activity plans, including AMPs should dovetail with the wildlife analysis in order to protect and maintain all possible public big game winter ranges; (2) acquire DOW properties along Escalante Creek proper; (3) consider acquiring DOW abandoned waterfowl areas along the Gunnison River to protect potential public values; and (4) plan to give staff support to establishment of Dominguez Primitive Area.

During development of MFP Step II, it was found that, although other resource objectives and recommendations required placement of certain constraints and tradeoffs on the range management objectives and recommendations, they also strongly enforced development of a sound range management (livestock) program:

1. Watershed objectives called for the lowering of soil surface factor (SSF) and decreasing the amount of sediment by improving livestock management and by initiating vegetation manipulations (chainings, watershed tillage, etc.).

2. Wildlife objectives called for the improvement of mule deer habitat by combining grazing allotments into manageable units and initiating rest rotation grazing systems. They also recommended that the imbalance in the food-cover ratio be remedied by chaining and controlled burning. Both of these wildlife objectives are examples of recommendations which enforced range management objectives.

3. The wildlife recommendation to reserve 50 percent of any increase in forage production for wildlife placed a constraint on livestock management as far as the allocation of any increase in available forage.

4. The wildlife recommendation to include in all seedings a mixture of shrubs and forbs as well as grasses was incorporated into range management and watershed recommendations.

5. The wildlife recommendation prohibiting herbicidal spraying placed a constraint on the program by requiring case by case decisions by the area manager and the wildlife biologist.

6. Wildlife recommendations for fence construction were incorporated into both watershed and range management recommendations.

7. Visual resource management recommendations placed constraints on the size, shape, design, etc., of any vegetation manipulations called for in other resource recommendations.

It should be noted that the MFP, by definition, provides fairly broad guidance concerning the appropriate management direction and constraints from which to develop a more detailed plan of action. Specific action plans for resource management involving programs such as range, wildlife, soils, watershed, minerals, cultural resources, and realty management on national resource lands, are developed based on the MFPs.

The activity plans, in this case, are called allotment management plans (AMPs). The following steps were used in the preparation of the AMPs for the ES area:

1. Review BLM planning data, collect and analyze additional resource data (e.g. soils, water, vegetation, wildlife), and contact range users.

2. Identify resource problems (e.g., winter grazing by livestock on crucial winter range for deer).

3. Establish objectives that would enhance the resource and resolve resource problems.

4. Develop a grazing system that would accomplish the objectives.

5. Establish the location for range improvements required for implementing the grazing system.

6. Develop evaluation procedures.

After the AMPs were prepared, a B/C analysis was done on each one, as discussed under Benefit/Cost Analysis earlier in this chapter. In addition, when the AMPs are implemented, the evaluation procedures built into each one (step 6 above) would also be initiated, and studies would be conducted to determine the effects of each grazing system (see Study and Monitoring Procedures in chapter 4).

BLM Energy Minerals Program

There is considerable underground coal mining and exploration taking place on NRL in the North Fork Valley. Due to the recognized coal potential in this area and along Cimarron Ridge, there is an increasing demand for new leases and increasing activity on existing leases. An ES is currently scheduled to start in October 1977 for West Central Colorado coal development to fully assess the impacts. In addition, there is increasing interest and activity in claim location and exploration for uranium in the Escalante area, west of the Gunnison River.

The impacts of mineral development cannot be assessed until the Energy Minerals Activity Recommendation System (EMARS) program has gone through the planning process, and more details on mining and marketing are available. However, the following general predictions about coal development can be made. There will be no surface mining; it will all be underground mining. Increased development of the mineral resources in the area will result in the construction of mining-associated facilities (i.e., access roads, transmission lines, water lines, waste disposal sites, etc.) on NRL. Construction of these facilities will disturb the native vegetation, resulting in a loss of livestock forage. However, all permits issued will have stipulations requiring rehabilitation of all disturbed areas. Through this mitigating measure, most disturbed areas will be restored to as near

their original condition as possible. Therefore, should coal development occur as expected in the next 20 to 30 years, it is anticipated that the total loss of livestock and wildlife forage in the area will be less than 1 percent.

Bureau of Reclamation

Dominguez Project

The Dominguez project is a USBR recreation and hydroelectric project involving approximately 11,980 acres of NRL. There are six permittees with six allotments (4001 Dominguez, 4002 Lower Escalante, 4006 Dry Mesa, 4016 Wells Gulch, 4017 Alkali Flats, and 4516 North Fork) involved in the withdrawn NRL area. The project is in the preliminary planning stage and had not been funded as of March 1977. Construction of the project will have minimal effect upon livestock grazing in the affected area.

Dallas Project

The Dallas project is designed to meet area needs for storage of irrigation, domestic, and industrial water. The USBR is currently purchasing lands, obtaining easements, and preparing contracts for bid on this project.

Construction of the Dallas project will result in the cancellation of grazing permits on seven allotments, totaling 2,410 acres, with a loss of 215 AUMs of livestock forage (see table 1-12). These allotments are part of the elimination of grazing component of the proposed action.

TABLE 1-12.—*Allotments on which grazing would be eliminated due to proposed Dallas project*

Allotments	AUMs [1]	Acres
5552 Dallas	24	240
5553 Fisher Creek	34	480
5555 Taylor Draw	55	325
5556 Burro Creek	15	120
5557 Alkali	20	485
5559 South Fork	12	120
5560 Cookie Tree	55	640
Total	215	2,410

[1]Present licensed use.
NOTE: These allotments are also listed on table 1-5 as part of the proposed action.

U.S. Forest Service

Eighty-eight of the NRL allotments used for grazing (covering 442,230 acres) are coordinated with national forest land (NFL) use: 53 proposed for AMPs (426,375 acres), 31 proposed for custodial (14,270 acres), 3 proposed for elimination of grazing (1,105 acres), and 1 proposed for limited trailing use (480 acres). (See table 1-13.) The most common situation in the ES area is for operators to move livestock from lower private lands to intermediate lands (NRL and private land) in the spring; then to higher NFL for the summer; then back onto NRL in the fall; and finally back onto private lands before winter.

The USFS and the BLM maintain separate management practices when an operator uses both NRL and NFL; however, there is close coordination among BLM, USFS, and permittees/licensees to work out grazing dates, trailing needs, and cooperative range improvements. Such coordination has ensured that the proposed action would harmonize with NFL use.

The BLM's wilderness inventory program will be coordinated with the Forest Service RARE program.

Colorado Division of Wildlife

The Billy Creek wildlife management area is within the ES area (5530 Billy Creek allotment). The DOW purchased the base properties, the qualifications were retired, and the land was managed exclusively for wildlife. The plan proposed for this area calls for reinstituting livestock use under a rest rotation system (see table 1-4).

DOW also owns additional lands in the Escalante Canyon area. These lands were purchased for wildlife use. Currently the BLM is managing grazing on these lands under a verbal agreement with DOW. The lands were included in the AMPs (4001 Dominguez and 4007 Sawmill Mesa) for adjoining NRL.

The long-range goal of the DOW is to increase and improve wildlife habitat in order to support higher populations of game and nongame wildlife species. Many of the objectives of the proposed action analyzed in this ES also involve the improvement of habitat to benefit wildlife species. Management objectives, as proposed in this statement, are therefore coordinated with those of the DOW. DOW personnel have assisted in inventory and analysis of possible black-footed ferret habitat but no conclusive evidence of the ferrets presence was found.

Predator control in the Montrose District is carried out under a three-way cooperative agreement with the DOW, Colorado Division of Animal Industry (DOAI), and the BLM. BLM authorizes activities on NRL, DOW issues the necessary

TABLE 1-13
ALLOTMENTS HAVING GRAZING PERMITS ON NATIONAL FOREST LANDS

A	4001	Dominguez	A	5014	Poison Springs
A	4002	Lower Escalante	A	5016	Black Canyon
A	4006	Dry Mesa	A	5017	Green Mountain
A	4007	Sawmill Mesa	A	5020	Black Ridge
A	4008	25 Mesa	C	5022	Rabbit Gulch
A	4010	Monitor Mesa	C	5033	Pinyon Springs
T	4011	Lower Roubideau Canyon	E	5037	Black Mesa
A	4012	Canal	C	5038	Red Canyon
A	4013	Ben Lowe	C	5040	Pine Ridge
A	4017	Alkali Flats	C	5041	East Gould Reservoir
A	4022	Petrie Mesa	C	5043	Collins
A	4024	Dirty George	C	5044	Big Pasture
A	4025	Ward Creek-Doughspoon	C	5046	Big Gulch
A	4502	Surface to Leroux	A	5502	Sandy Wash
A	4503	Stingley Gulch	A	5504	Roatcap
A	4504	Leroux Creek	A	5505	Transfer
A	4507	Jay Creek	A	5507	Pipeline
A	4509	Upper Jay Creek	A	5508	Government Springs
A	4513	Stevens Gulch	C	5509	Coal Creek
A	4516	North Fork	C	5510	Bald Hills
A	4517	Coal Gulch	A	5511	Shavano Mesa
C	4518	Pilot Creek	A	5512	Franklin Mesa
C	4520	Spring Creek	A	5513	Dry Creek Basin
C	4521	Stock Driveway	C	5514	East Fork Dry Creek
C	4522	Downing	C	5515	Olathe Reservoir
C	4523	Williams Creek	C	5517	Spring Creek Canyon
A	4525	Anthracite Creek	A	5520	Lower Horsefly
A	4527	Jumbo Mountain	A	5521	Highway 90
A	4528	Oak Ridge	A	5522	Beaver Hill
A	4529	Reynolds Creek	C	5524	Duckett Draw
A	4530	McDonald Mesa	C	5525	Dry Creek
C	4531	Popp Ranch	A	5530	Billy Creek
A	4532	McDonald Ranch	C	5533	Onion Lakes
C	4535	Home Place	A	5534	Shin Park
C	4538	Missouri Flats	C	5536	South Canal
C	4539	Cottonwood Creek	A	5540	Dry Gulch
A	4540	North Saddle Peak	C	5548	Washboard Rock
C	4543	South Saddle Peak	C	5549	High Park
A	4549	Dry Creek	E	5557	Alkali
C	5002	Dedication Site	E	5559	South Fork
A	5008	Brush Point	C	5563	Moonshine Park
A	5010	Dead Horse	A	5566	Cow Creek
A	5011	Gould Reservoir	A	5568	Baldy
A	5013	Iron Canyon	A	5570	Cedar

Note: A = proposed AMP; C = proposed custodial management; T = proposed limited trailing use; and E = proposed elimination of grazing. See tables 1-4 and 1-5 for more detail.

authorization to conduct aerial gunning operations, and DOAI carries out the control activities under the terms and stipulations of the management agencies.

Environmental Protection Agency

Section 208 of the Federal Water Pollution Control Act (FWPCA) provided local governments with the necessary authority for the control of point and nonpoint sources of water pollution. The four major areas of concern in 208 planning for the ES area are (1) agricultural discharge, (2) municipal discharge, (3) mining waste, and (4) stream classification. To comply with the goals and objectives of section 208, EPA and BLM have made a national agreement which provides for cooperation whenever possible to meet the requirements of the act.

Coordination among federal, state, and local 208 planning agencies in the ES area began in 1977. In June 1977, the Colorado State Office of BLM entered into a formal memorandum of understanding with the Governor's Office for the purpose of coordinating efforts conducted pursuant to 208. EPA has reached an agreement with the Colorado State Office that best management practices are equated with MFP decisions and that BLM in Colorado will retain control of water quality planning and implementation on public lands.

Water quality management planning in the nondesignated area encompassing the ES area has taken place in workshops in which BLM has participated. During the period in which the proposed action of this ES is implemented, a 208 plan will be written which will set up the best management practices, including management for grazing practices on private and federal land. BLM will participate in developing the 208 plan for the area.

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

The description of the existing environment covers the following fourteen resources or land uses: topography and geology, climate, air quality, soils, water resources, vegetation, wildlife (terrestrial and riparian/aquatic), cultural resources (archeological and historical), visual resources, recreation, agriculture (farming and grazing), land uses, transportation networks, and socio-economic conditions. The degree of detail in the description of each resource or land use relates directly to the degree of anticipated impacts. The concluding section of this chapter describes the anticipated future environment if the proposed action is not implemented.

EXISTING ENVIRONMENT

Topography and Geology

The environmental statement (ES) area is located on the western slope of the Rocky Mountains on the edge of the Southwestern Desert. It is an area of broad valleys encircled by mountains, mesas, and plateaus. Elevation varies from 5,000 feet in the Gunnison River Valley northwest of Delta to over 11,000 feet in highland areas.

The area lies on the boundary of two major physiographic provinces: the Rocky Mountains and the Colorado Plateau. Because of its position, the area has characteristics of both provinces. Along its western boundary, stretch the broad mesas and steep canyons of the Colorado Plateau. This massive, gentle uplift has gradually tilted sedimentary rocks in the area to the northeast. To the east, the peaks of the Rocky Mountains tower at more than 10,000 feet elevation. The series of ranges forming the Rockies are the result of a major orogenic (mountain building) period during Late Tertiary times (60 million years ago).

The ES area is bounded on the west by the Uncompahgre Plateau, a northern edge of the Colorado Plateau. It is a gentle, crustal flexure of sedimentary rocks trending northwest from Ridgway. Along the plateau's northern flank stretches a long series of mesas sloping to the northeast (slope approximately 4 percent). Dissecting the mesas are deep canyons containing perennial and intermittent streams flowing northeast to the Uncompahgre River. These canyons are often 200 to 1,500 feet below the mesa tops.

Grand Mesa, which forms the northern boundary of the ES area, is a large, flat-topped mountain. At higher elevations (8,000 to 10,000 feet), its southern slopes are composed of steep ridges which give way to gently (5 percent) sloping mesas at 6,000 to 8,000 feet. The orientation of these mesas is generally at right angles to Grand Mesa and varies from southwest to southeast. Variation in elevation from intervening canyons to mesa tops may be as much as 400 feet.

These mesas abruptly end 4 to 5 miles north of the North Fork River where the well-rounded forms of the adobe badlands begin and stretch to the river. In these badlands, topography is extremely irregular; this badlands topography is the result of intricate erosional patterns on soft (Mancos) shales. Farther east, as the North Fork approaches the West Elk Mountains, the mesas and adobe badlands narrow until, at Bowie, ridges extend to meet the North Fork Valley. In their lower reaches the Uncompahgre and North Fork river valleys occupy broad expanses lying from 5,000 to 6,000 feet.

On the east of the ES area lie the West Elk Mountains and (to the south) Cimarron Ridge which tower 5,000 feet above the surrounding countryside. Both are products of volcanic flow and intrusions; Cimarron Ridge is a northern extension of the volcanic material which composes the rugged San Juan Mountains. Erosional processes operating over the past 50 million years have created spectacular peaks, spires, and monoliths, many at 10,000 feet elevation. Below these cliffs and spires lie gentler slopes, deeply cut by intermittent and perennial streams. These streams flow west and northwest to the Uncompahgre River.

The topography of the ES area strongly influences the human activity which takes place there. In relation to livestock grazing, topography not only constitutes natural barriers which serve as allotment boundaries, but also dictates to varying degrees season and class of livestock use.

Climate

The ES area is located at high elevations (5,000 to 10,000 feet) in the midlatitudes of the continent. In highland or mountainous areas such as this, topographic features strongly influence local climate, and the most characteristic feature of the area's climate is variability. The chief determining factors are variations in elevation (relief), direction of exposure (aspect), and orientation of mountain valleys with respect to prevailing air

currents. The climatic aspects most critical to the success of the proposed action are length of growing season and precipitation.

There are seven climatic stations located in the ES area: Paonia 1SW, Cedaredge, Delta 3NW, Olathe, Cimarron, Montrose No. 1, and Montrose No. 2. Together with the station at Ouray, just south of the area, they provide good coverage of the area (see map 2-1). However, application of data from these stations to unmonitored areas is difficult because topography does produce considerable local climatic variations. (The information collected by these stations is summarized by the National Oceanic and Atmospheric Administration in *Climatological Data*, published monthly, seasonally, and annually. Figures A-1 to A-5 in appendix 1 are graphs showing annual precipitation, average temperature, and average snowfall as reported by these stations from 1950 to 1975.)

The area experiences large diurnal (daily) and annual temperature changes, as well as rapid changes of weather due to storms moving from the southwest into the region. Diurnal variations are usually about 30 degrees; for example, for December 27, 1976, in Delta the minimum temperature was 10 degrees and the maximum was 46 degrees. In 1965 the annual temperatures varied in Delta from a high of 99 degrees in August to a low of —2 degrees in January, and in Cimarron from a high of 90 degrees to a low of —25 degrees for the same two months. Throughout the Gunnison River Valley the growing season is from 160 to 190 days. Table 2-1 summarizes minimum temperature data for this area. Again, freeze and growing season data are dependent upon minimum temperature which, due to the local movements of air masses, can vary considerably throughout the ES area.

Precipitation occurs in several types on lands of the ES area, namely snow, rain, hail, and drizzle. Total annual precipitation varies considerably throughout the area, from a low of 8 inches annually in the western part of the area around Delta to an average of 20 inches in the upper ends of the North Fork and Uncompahgre river valleys. The central and eastern portions of the ES area surrounding the Gunnison Gorge are dry, and this area averages about 10 inches of precipitation annually. (U.S. Department of Agriculture, Soil Conservation Service 1975)

From 50 to 60 percent of annual precipitation falls as afternoon and evening storms between May and September. These storms are the result of solar heating which generates large convective showers or thunderstorms. They can be characterized as being of short duration, low volume, and limited spatial extent. Only the few most intense storms produce stream flow.

During winter months cyclonic storms bring snow across the area every four to seven days. The behavior of these storms is extremely erratic, and annual snowfall is largely the result of large storms. No data are available on snow depth or snow water content on grazing lands.

Hail, which results from large vertical air movements, occurs on an average of three days per year in the area.

Prevailing ground winds are from the southwest. Often a gentle southeast wind (less than 5 miles per hour) arises early in the morning; however, by 9:00 a.m. the southwest wind has picked up.

Inversion phenomena are frequent, especially during winter months. However, because there are no major blockages of air currents, the inversions are short-lived. They are usually dispersed by midmorning when the prevailing southwest wind picks up.

Air Quality

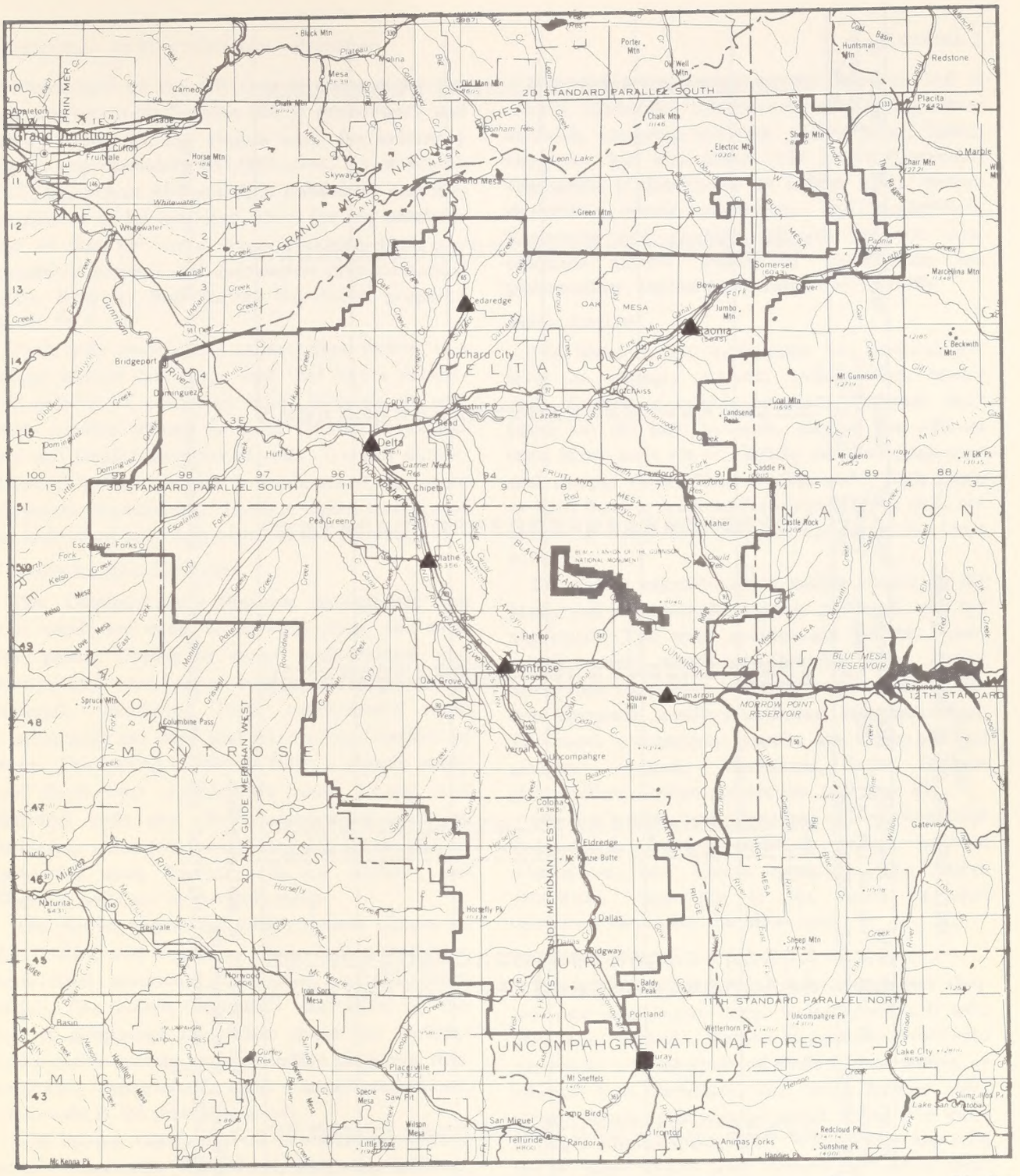
The ES area is included within the Grand Mesa Air Quality Control Region No. 7, a region with no major air quality problems. The state of Colorado has not designated the area as being within an Air Pollution Control Area. (Bureau of Economic Research 1975; Council on Environmental Quality 1973)

Because of the low level of industrial development in the ES area, there has been no attempt to determine air quality by measuring the level of air pollution. More attention has been focused on the rate of generation of gaseous and particulate pollutants. Because this rate of generation of pollutants is so low (less than 150 micrograms per cubic meter in a 24-hour period), air quality in the region is stable. (Bureau of Economic Research 1975; Sarnoff 1971)

Soils

Soils Associations

The soils associations (mapping units) which occur in the ES area are shown on map 2-2 and listed (by allotment) on table 2-2. The associations were derived from two sources. The



LEGEND

▲ Climatic Stations in the E.S. Area.

■ Climatic Station Adjacent to E.S. Area.

Map 2-1. Climatic Stations

TABLE 2-1
FREEZE DATA FOR THE ES AREA (1931-1960)

Station	Freeze Threshold Temperature	Mean Date of Last Spring Occurrence	Mean Date of 1st Fall Occurrence	Mean Number of Days Between Dates	Years of Record Spring	Number of Occurrences in Spring	Years of Record Fall	Number of Occurrences in Fall
Cedaredge	32	05-17	10-07	143	10	10	10	10
	28	04-23	10-08	178	10	10	10	10
	24	04-19	10-28	192	10	10	10	10
	16	03-24	11-14	235	10	10	10	10
Crested Butte	32	06-24	07-23	29	30	30	29	29
	28	06-12	09-04	84	30	30	29	29
	24	05-31	09-21	113	30	30	29	29
	20	05-10	10-01	144	30	30	28	28
	16	04-27	10-15	171	30	30	28	28
Delta 1E	32	05-09	10-03	147	30	30	30	30
	28	04-28	10-14	169	30	30	30	30
	24	04-13	10-25	195	30	30	30	30
	20	04-02	10-31	212	30	30	30	30
	16	03-19	11-14	240	30	30	30	30
Montrose No. 2	32	05-08	10-12	157	10	10	10	10
	28	04-24	10-19	178	10	10	10	10
	24	04-16	11-01	199	10	10	10	10
	20	04-02	11-07	219	10	10	10	10
	16	03-21	11-15	239	10	10	10	10
Montrose No. 1	32	05-08	10-08	153	20	20	20	20
	28	04-28	10-21	176	20	20	20	20
	24	04-13	11-01	202	20	20	20	20
	20	03-23	11-04	226	20	20	20	20
	16	03-18	11-18	245	20	20	20	20
Paonia 1S	32	05-19	10-04	138	24	24	22	22
	28	04-29	10-17	171	25	25	21	21
	24	04-15	10-29	297	25	25	21	21
	20	04-04	10-16	216	24	24	21	21
	16	03-18	11-14	241	23	24	20	20

Note: This data is based on the period 1931-1960 or available data.
Means are adjusted to take in years of nonoccurrence.
A freeze is a numerical substitute for the term "killing frost" and is the occurrence of a minimum temperature at or below the threshold temperature (e.g., 32, 28, 24, . . .).

northern half of the ES area is covered by the Soil Conservation Service (SCS) preliminary soil survey report for the Paonia area; the inventory covers approximately 635,000 acres. As of March 1977, this report had not been published, and it is considered to be tentative. Data for the southern half of the ES areas were obtained from the completed general soil association map contained in the Ridgway Soil Survey Handbook prepared by the SCS.

Each soils association, as described below, is a unique natural landscape unit that has a distinctive pattern of soils and relief features. It normally consists of one or more soils of major extent and small inclusions of soils of minor extent. (Table A-1, in appendix 2, summarizes the more important physical and chemical characteristics of the individual soils that occur in the ES area.)

UTALINE-LAZEAR-SHAVANO

The Utaline-Lazear-Shavano association has soils which are deep, moderately deep, and shallow; gently sloping to steep; well-drained; and loamy; they were formed in outwash alluvium and materials weathered from sedimentary rock. Utaline soils are deep and have a high content of stone. The parent materials form a mantle many feet thick over sedimentary rock. Lazear and Shavano soils are closely associated and are formed in place from weathered sandstone and interbedded shale. Lazear soils are shallow, and Shavano soils are moderately deep.

The native vegetation which mainly occurs on the Utaline soil is galleta grass, Indian ricegrass, squirreltail, shadscale, sagebrush, and tall rabbitbrush. The native (potential) vegetation on this soil is dominated by galleta grass but includes other native species such as Indian ricegrass, muttongrass, squirreltail, and needle-and-thread. Shadscale is the principal shrub.

The native vegetation on the Lazears soils is mainly shadscale, snakeweed, fourwing saltbush, rabbitbrush, galleta grass, Indian ricegrass, and squirreltail. The native (potential) vegetation is usually dominated by galleta grass. The most common secondary grasses are Indian ricegrass, needle-and-thread, and squirreltail. Shadscale is usually the dominant shrub. Common forbs are globemallow and poison vetch. Juniper and mountain mahogany may occur on the site but at the higher elevations.

The native vegetation on the Shavano soil is mainly shadscale, snakeweed, mat and gardner saltbush, fourwing saltbush, galleta grass, Indian ricegrass, and squirreltail. The native (potential) vegetation is dominated by galleta grass, Indian ricegrass, needle-and-thread, and squirreltail. Shadscale and gardner saltbush are the conspicuous shrubs. Forbs of significance are globemallow, Indian paintbrush, and sego lily.

MESA-AVALON

The Mesa-Avalon association has deep, nearly level to strongly sloping, well-drained, loamy soils, formed in cobbly or stony alluvium; they occur on old high terraces, mesas, and alluvial fans. Mesa soils are on slightly elevated ridge tops and steeper slopes than Avalon soils. Both kinds of soils have a loam surface layer. Mesa soils are cobbly or stony in some areas and have clay loam subsoils.

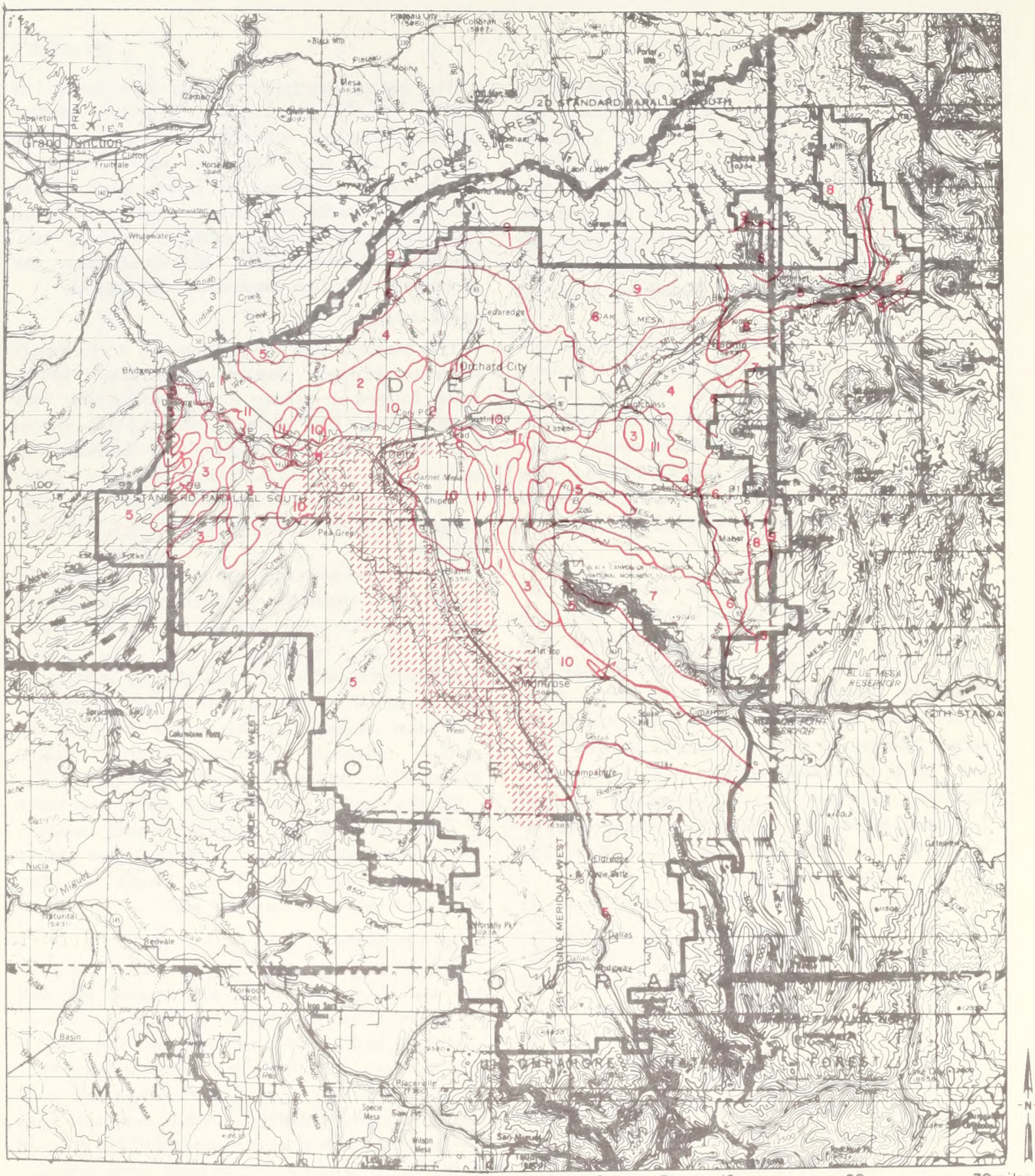
The native vegetation that mainly occurs on the Mesa soil is shadscale, gardner saltbush, and big sagebrush. The main grasses are galleta, squirreltail, and needle-and-thread. The native (potential) vegetation is dominated by galleta, Indian ricegrass, needle-and-thread, and squirreltail. The most conspicuous shrubs are shadscale and gardner saltbush. Significant forbs include globemallow, Indian paintbrush, and sego lily.

On the Avalon soils the main native vegetation is shadscale, fourwing saltbush, galleta, western wheatgrass, and Indian ricegrass. The native (potential) vegetation is the same as that described above for the Mesa soils.

KECH-PROGRESSO

The Kech-Progresso soils association has shallow and moderately deep, well-drained soil with clay loam subsoils, formed in partially weathered sandstone and interbedded shale and occurring on alluvial fans, benches, and steep upland back slopes. Kech soils occupy small ridges and more strongly sloping topography, while Progresso soils are on more nearly level topography and in small depressions. Both soils have loam surface layers. Kech has partially weathered sandstone bedrock above 20 inches; Progresso has a sandstone bedrock between 20 and 40 inches.

The native vegetation mainly occurring on the Kech soil is pinyon-juniper, mountain mahogany, big sagebrush, wheatgrasses, Junegrasses, Indian ricegrass, and squirreltail. The native (potential) vegetation of the understory plants is Indian



LEGEND

MAP SYMBOL	MAP UNITS
1	LAZEARS-UTALINE-SHAVANO
2	MESA-AVALON
3	KECH-PROGRESSO
4	SARTON-AQUA FRIA
5	USTOLLIC HAPLARGIDS-ROCKOUTCROP
6	DELSON-CERRO
7	ABSAROKEE-BEENON
8	FUGHES-BULKEY
9	COCHETOPA-NORTHWATER
10	CHIPETA-PERSAYO-BADLANDS
11	BILLINGS-GULLIED LAND
	PRIVATE LANDS

Map 2-2. Soil Associations

TABLE 2-2
SOIL ASSOCIATIONS BY ALLOTMENT

Allotment Name & No.	Soil Associations a/ 1	2	3	4	5	6	7	8	9	10	11	Total Acres
4001 Dominguez	-	-	14,710	-	43,625	-	-	-	-	-	-	58,335
4002 Lower Escalante	-	-	900	-	1,340	-	-	-	-	-	-	2,240
4005 Fall Cabin	-	-	-	-	360	-	-	-	-	-	-	360
4006 Dry Mesa	-	-	7,140	-	11,755	-	-	-	-	-	-	18,895
4007 Sawmill Mesa	-	-	3,320	-	8,535	-	-	-	-	240	-	12,095
4008 25 Mesa	-	-	200	-	9,425	-	-	-	-	780	-	10,405
4010 Monitor Mesa	-	-	-	-	15,735	-	-	-	-	-	-	15,735
4011 Lower Roubideau Canyon	-	-	-	-	480	-	-	-	-	-	-	480
4012 Canal	-	-	-	-	10,650	-	-	-	-	-	-	10,650
4013 Ben Lowe	-	-	-	-	5,490	-	-	-	-	-	-	5,490
4014 Joker	-	-	-	-	1,835	-	-	-	-	-	-	1,835
4015 White Ranch	-	-	-	-	415	-	-	-	-	-	-	415
4016 Wells Gulch	11,395	-	-	2,280	2,880	200	-	-	-	-	200	16,955
4017 Alkali Flats	10,075	890	7,050	5,735	2,540	-	-	-	-	380	1,160	27,830
4021 Point Creek	390	-	-	360	-	-	-	-	-	-	250	1,000
4022 Petrie Mesa	3,400	2,465	1,960	160	-	-	-	-	-	2,345	3,530	13,860
4024 Dirty George	-	-	-	-	-	2,125	-	-	260	-	-	2,385
4025 Ward Creek-Doughspoon	170	3,760	-	5,330	-	1,650	-	-	-	7,000	-	17,910
4026 Escalante Canyon	-	-	80	-	1,190	-	-	-	-	-	-	1,270
4501 Milk Creek	-	-	-	-	-	105	-	-	-	-	-	105
4502 Surface to Leroux	-	-	-	1,915	-	1,315	-	-	-	-	-	3,230
4503 Stingley Gulch	-	-	-	265	-	815	-	-	-	-	-	1,080
4504 Leroux Creek	-	-	-	565	-	1,990	-	-	-	-	-	2,555
4505 Juniper Knob	-	-	-	120	-	-	-	-	-	-	-	120
4506 Oak Mesa	-	-	-	535	-	815	-	-	-	-	-	1,350
4507 Jay Creek	-	-	-	4,065	-	5,140	-	-	-	-	-	9,205
4509 Upper Jay Creek	-	-	-	-	-	430	-	-	-	-	-	430
4511 Overland	-	-	-	-	-	160	-	-	-	-	-	160
4512 East Roatcap	-	-	-	-	-	-	-	-	30	-	-	30
4513 Stevens Gulch	-	-	-	3,780	400	2,355	-	20	-	-	-	6,555

a/ 1. Utalene-Lazears-Shavano
2. Mesa-Avalon
3. Kech-Progresso
4. Sarton-Agua Frio
5. Ustollic-Haplargids-Rock Outcrop
6. Delson-Cerro
7. Absarokee-Beenon
8. Fughes-Bulkley
9. Cochetopa-Northwater
10. Badlands-Chipeta-Persayo
11. Billings-Gullied Lands

TABLE 2-2
SOIL ASSOCIATIONS BY ALLOTMENT (cont.)

Allotment Name & No.	Soil Associations a/ 1	2	3	4	5	6	7	8	9	10	11	Total Acres
4514 Upper Terror Creek	-	-	-	-	-	30	-	-	-	-	-	30
4515 Freeman Gulch	-	-	-	140	160	320	-	-	-	-	-	620
4516 North Fork	7,700	-	1,360	1,400	4,810	1,580	-	-	-	3,715	2,855	23,420
4517 Coal Gulch	-	-	-	-	6,200	180	-	1,340	-	-	-	7,720
4518 Pilot Creek	-	-	-	-	-	-	-	-	45	-	-	45
4519 Muddy Creek	-	-	-	-	120	-	-	380	-	-	-	500
4520 Spring Creek	-	-	-	-	120	-	-	-	-	-	-	120
4521 Stock Driveway	-	-	-	-	40	-	-	80	-	-	-	120
4522 Downing	-	-	-	-	-	-	-	120	-	-	-	120
4523 Williams Creek	-	-	-	-	110	-	-	-	-	-	-	110
4524 Deep Creek	-	-	-	-	160	-	-	-	-	-	-	160
4525 Anthracite Creek	-	-	-	-	80	-	-	1,035	-	-	-	1,115
4526 Crystal Creek	-	-	-	-	400	-	-	80	-	-	-	480
4527 Jumbo Mountain	-	-	-	-	-	-	1,050	3,920	-	-	-	4,970
4528 Oak Ridge	-	-	-	400	-	-	3,200	-	-	-	-	3,600
4529 Reynolds Creek	-	-	-	-	-	1,200	-	-	-	-	-	1,200
4530 McDonald Mesa	-	-	-	2,865	-	320	-	-	-	-	-	3,185
4531 Popp Ranch	-	-	-	65	-	200	-	-	-	-	-	265
4532 McDonald Ranch	-	-	830	2,390	-	-	-	-	-	-	4,110	7,330
4535 Home Place	-	-	160	-	-	-	-	-	-	-	-	160
4536 West Young's Peak	-	-	80	80	-	-	-	-	-	-	-	160
4537 Young's Peak	-	-	600	1,920	-	-	-	-	-	-	-	2,520
4538 Missouri Flats	-	-	-	-	-	120	-	-	-	-	-	120
4539 Cottonwood Creek	-	-	-	-	-	120	-	-	-	-	-	120
4540 North Saddle Peak	-	-	-	-	-	240	-	-	-	-	-	240
4541 Sunshine Mesa	-	-	-	40	-	-	-	-	-	-	-	40
4543 South Saddle Peak	-	-	-	-	-	185	-	35	-	-	-	220
4548 Creek Bottom	-	-	-	-	120	-	-	65	-	-	-	185
4549 Dry Creek	-	-	-	150	-	2,960	-	-	-	-	-	3,110
5002 Dedication Site	20	-	45	-	1,850	-	-	-	-	-	-	1,915
5003 Selig Canal	840	-	-	-	2,005	-	-	-	-	4,470	350	7,665
5008 Brush Point	2,240	-	1,600	-	1,680	-	-	-	-	12,685	-	18,205
5010 Dead Horse	-	-	-	-	10	-	945	-	-	-	-	955
5011 Gould Reservoir	-	-	-	-	-	-	2,825	-	-	-	-	2,825
5012 Cedar Point	-	-	530	-	-	-	90	-	-	-	-	620
5013 Iron Canyon	-	-	70	-	-	-	1,265	-	-	-	-	1,335
5014 Poison Spring	-	-	660	-	160	-	750	-	-	-	-	1,570
5015 Grizzly Gulch	-	-	-	-	-	-	1,930	-	-	-	-	1,930
5016 Black Canyon	-	-	-	-	-	-	440	-	-	-	-	440
5017 Green Mountain	-	-	-	-	7,855	-	12,970	-	-	-	-	20,825
5020 Black Ridge	-	-	3,995	-	2,880	-	-	-	-	-	-	6,875
5022 Rabbit Gulch	-	-	815	-	435	-	-	-	-	-	-	1,250
5025 Fruitland Mesa	-	-	80	-	-	-	-	-	-	-	-	80

TABLE 2-2
SOIL ASSOCIATIONS BY ALLOTMENT (cont.)

Allotment Name & No.	Soil Associations a/ 1	2	3	4	5	6	7	8	9	10	11	Total Acres
5026 Star Nelson Airport	-	-	-	-	-	-	-	-	-	35	45	80
5027 Adobe	-	-	-	-	-	300	-	-	-	-	-	300
5028 Doug Creek	-	-	-	-	-	400	-	-	-	-	-	400
5029 Spring Gulch	-	-	-	-	1,025	-	405	-	-	-	-	1,430
5030 Bostwick Park	-	-	-	-	2,015	-	-	-	-	3,480	-	5,495
5033 Pinyon Springs	-	-	-	-	1,030	-	-	-	-	-	-	1,030
5036 Big Gulch	-	-	-	40	-	-	-	-	-	-	-	40
5037 Black Mesa	-	-	-	-	500	-	-	-	-	-	-	500
5038 Red Canyon	-	-	70	-	10	-	-	-	-	-	-	80
5039 Onion Valley	-	-	-	-	-	-	40	-	-	-	-	40
5040 Pine Ridge	-	-	-	-	-	-	80	-	-	-	-	80
5041 East Gould Reservoir	-	-	320	-	-	300	-	-	-	-	-	620
5043 Collins	-	-	15	-	-	185	-	-	-	-	-	200
5044 Big Pasture	-	-	-	-	-	200	-	-	-	-	-	200
5045 Black Bullet	-	-	90	-	-	-	-	-	-	-	-	90
5046 Big Gulch	-	80	-	240	-	-	-	-	-	120	-	440
5047 Mesa Creek	-	-	-	-	640	-	-	-	-	-	-	640
5048 Morrow Point	-	-	-	-	1,035	-	-	-	-	-	-	1,035
5049 Smith Fork	-	-	420	-	30	-	-	-	-	-	-	450
5050 Allen Reservoir	-	-	-	-	-	200	-	-	-	-	-	200
5502 Sandy Wash	-	-	-	-	7,530	-	-	-	-	-	-	7,530
5503 Green	-	-	-	-	450	-	-	-	-	-	-	450
5504 Roatcap	-	-	-	-	3,070	-	-	-	-	-	-	3,070
5505 Transfer	-	-	-	-	2,970	-	-	-	-	-	-	2,970
5507 Pipeline	-	-	-	-	19,190	-	-	-	-	-	-	19,190
5508 Government Springs	-	-	-	-	2,260	-	-	-	-	-	-	2,260
5509 Coal Creek	-	-	-	-	320	-	-	-	-	-	-	320
5510 Bald Hills	-	-	-	-	205	-	-	-	-	-	-	205
5511 Shavano Mesa	-	-	-	-	2,015	-	-	-	-	-	-	2,015
5512 Franklin Mesa	-	-	-	-	3,600	-	-	-	-	-	-	3,600
5513 Dry Creek Basin	-	-	-	-	5,425	-	-	-	-	-	-	5,425
5514 East Fork Dry Creek	-	-	-	-	135	-	-	-	-	-	-	135
5515 Olathe Reservoir	-	-	-	-	185	-	-	-	-	-	-	185
5516 Piney	-	-	-	-	8,335	-	-	-	-	-	-	8,335
5517 Spring Creek	-	-	-	-	440	-	-	-	-	-	-	440
5518 Dave Wood	-	-	-	-	2,565	-	-	-	-	-	-	2,565
5520 Lower Horsefly	-	-	-	-	6,215	-	-	-	-	4,150	-	10,365
5521 Highway 90	-	-	-	-	6,215	-	-	-	-	-	-	6,215
5522 Beaver Hill	-	-	-	-	19,785	-	-	-	-	-	-	19,785
5523 Horsefly	-	-	-	-	640	-	-	-	-	-	-	640
5524 Duckett Draw	-	-	-	-	275	-	-	-	-	-	-	275
5525 Dry Creek	-	-	-	-	100	-	-	-	-	-	-	100

TABLE 2-2
SOIL ASSOCIATIONS BY ALLOTMENT (cont.)

Allotment Name & No.	Soil Associations a/ 1	2	3	4	5	6	7	8	9	10	11	Total Acres
5529 Log Hill	-	-	-	-	4,345	-	-	-	-	-	-	4,345
5530 Billy Creek	-	-	-	-	3,995	-	-	-	-	-	-	3,995
5532 Burro Ridge	-	-	-	-	200	-	-	-	-	-	-	200
5533 Onion Lakes	-	-	-	-	470	-	-	-	-	160	-	630
5534 Shin Park	-	-	-	-	-	-	-	-	-	3,970	-	3,970
5535 Cedar Creek	-	-	-	-	-	-	-	-	-	240	-	240
5536 South Canal	-	-	-	-	-	-	-	-	-	2,115	-	2,115
5538 Rock Ditch	-	-	-	-	-	-	-	-	-	55	-	55
5540 Dry Gulch	-	-	-	-	4,860	-	-	-	-	-	-	4,860
5542 Bosgal	-	-	-	-	-	-	-	-	-	50	-	50
5543 Waugh	-	-	-	-	-	-	-	-	-	200	-	200
5544 Kelly	-	-	-	-	-	-	-	-	-	80	-	80
5545 Henshaw	-	-	-	-	-	-	-	-	-	170	-	170
5546 Waterdog Basin	-	-	-	-	335	-	-	-	-	65	-	400
5547 Slagle Pass	-	-	-	-	310	-	-	-	-	-	-	310
5548 Washboard Rock	-	-	-	-	760	-	-	-	-	-	-	760
5549 High Park	-	-	-	-	1,660	-	-	-	-	-	-	1,660
5551 Dexter Creek	-	-	-	-	65	-	-	-	-	-	-	65
5552 Dallas	-	-	-	-	240	-	-	-	-	-	-	240
5553 Fisher Creek	-	-	-	-	480	-	-	-	-	-	-	480
5555 Taylor Draw	-	-	-	-	325	-	-	-	-	-	-	325
5556 Burro Creek	-	-	-	-	120	-	-	-	-	-	-	120
5557 Alkali	-	-	-	-	485	-	-	-	-	-	-	485
5559 South Fork	-	-	-	-	120	-	-	-	-	-	-	120
5560 Cookie Tree	-	-	-	-	640	-	-	-	-	-	-	640
5561 East Fork	-	-	-	-	80	-	-	-	-	-	-	80
5562 Hillside	-	-	-	-	160	-	-	-	-	-	-	160
5563 Moonshine Park	-	-	-	-	230	-	-	-	-	-	-	230
5564 Gravel Pit	-	-	-	-	40	-	-	-	-	-	-	40
5565 Tommy Creek	-	-	-	-	120	-	-	-	-	-	-	120
5566 Cow Creek	-	-	-	-	520	-	-	-	-	-	-	520
5567 Busted Boiler	-	-	-	-	40	-	-	-	-	-	-	40
5568 Baldy	-	-	-	-	680	-	-	-	-	-	-	680
5569 Hairpin	-	-	-	-	-	-	-	-	-	500	-	500
5570 Cedar	-	-	-	-	2,125	-	-	-	-	-	-	2,125
5572 McKenzie Creek	-	-	-	-	110	-	-	-	-	-	-	110
5574 Tappan Creek	-	-	-	-	240	-	-	-	-	-	-	240
TOTALS	36,230	7,195	47,100	34,840	267,815	26,140	25,990	7,075	335	47,005	12,500	512,225

ricegrass, muttongrass, prairie Junegrass, big sagebrush, serviceberry, and cliff rose.

On the Progresso soil the native vegetation mainly occurring is pinyon-juniper, Indian ricegrass, needle-and-thread, Junegrass, and blue bunch and other wheatgrasses. The native (potential) vegetation is predominantly western wheatgrass and muttongrass. Other common grasses are Junegrass, needle-and-thread, Indian ricegrass, and squirreltail. Goldenrod, lupine, buckwheat, phlox, and a number of other forbs grow in small amounts. Small amounts of low woody and semi-woody plants are common. Big sagebrush and black sage are the dominant shrubs on the site. Tree species most common on the site are pinyon pine and Utah juniper. The potential of this site to maintain itself in a grass cover depends upon keeping the tree cover suppressed.

SARATON-AGUA FRIA

The Saraton-Agua Fria association has moderately deep and deep, gently sloping, hilly and steep, well-drained soils that have loam or clay loam subsoils. The soils were formed in outwash alluvium from igneous rock; they occur on old high terraces, mesas, and upland back slopes. Saraton soils usually have a gravelly or stony loam surface and underlying layers, with pinkish white marl between 20 and 40 inches. Agua Fria soils have stony loam surfaces and clay loam subsoils.

The main native vegetation occurring on the Saraton soil is big sagebrush and pinyon-juniper with grasses such as muttongrass, Indian ricegrass, squirreltail, and wheatgrasses. The native (potential) vegetation is dominated by blue bunch wheatgrass, western wheatgrass, Junegrass, galleta grass, needle-and-thread, and squirreltail. The native (potential) vegetation understory on the woodland portion of this soil is the same as for the Progresso soil described above.

The native vegetation which occurs on the Agua Fria soil is mainly big sagebrush and pinyon-juniper with grasses such as western wheatgrass, Indian ricegrass, needle-and-thread, and Junegrass. The native (potential) vegetation is the same as that described for the Progresso soils above.

USTOLLIC HAPLARGID-ROCK OUTCROPS

The Ustollic Haplargid-rock outcrops association consists of moderately deep to deep stony soils with outcrops of bedrock. It occurs on gently sloping to steep valley sideslopes, deserted plateaus, and mesas. Dominant parent materials are sandstone, interbedded sandstone, and shale. The Ustollic-Haplargids are well-drained and usually contain less than 35 percent rock fragments. Depth to bedrock ranges from 15 to 60 inches. The rock outcrops consist of exposed bedrock with up to 10 percent very shallow, stony soil material over bedrock.

The main native vegetation that occurs on the mesas and plateaus of this soil unit is big sage, Indian ricegrass, needle-and-thread, Junegrass, blue bunch wheatgrass with scattered pinyon and juniper. The native (potential) vegetation on this unit is similar to that described for the Progresso soil above.

The native vegetation that occurs on the rest of the unit is mainly pinyon-juniper with an understory of wheatgrasses, Junegrass, Indian ricegrass, and squirreltail. The native (potential) vegetation of the understory on that portion of the unit is predominantly Indian ricegrass, muttongrass, sedge, prairie Junegrass, big sage, serviceberry, and cliff rose.

DELSON-CERRO

The Delson-Cerro association has deep, gently sloping to steep, well-drained soils that have clayey subsoils. The soils were formed in stony alluvium derived from igneous rock; they occur on old fans, mesas, and steep mountain back slopes. Both kinds of soils have loam or stony loam surface layers and clayey subsoils. Cerro soils are calcareous below about 26 inches.

The native vegetation that mainly occurs on the Delson soil is gambel oak, serviceberry, and big sage with wheatgrasses, bluegrasses, and needle-and-thread. The native (potential) vegetation principally consists of western wheatgrass, slender wheatgrass, and in the lower elevations wheatgrass. Muttongrass, nodding brome, needlegrass, and squirreltail are frequently occurring grasses. Major forbs are silver lupine, geranium, and buckwheat. Serviceberry and snowberry grow in scattered stands.

The native vegetation that mainly occurs on the Cerro soils is western wheatgrass and big sage with gambel oak, serviceberry, and scattered pinyon-juniper. The native (potential) vegetation for this soil is the same as that described above for the Delson soils.

ABSAROKEE-BEENON

The Absarokee-Beenon association consists of moderately deep and shallow, gently sloping to very steep, well-drained soils that have clayey subsoils, formed in materials weathered from sandstone and interbedded shale. They occur on fans, rolling uplands, and steep or very steep mountain slopes. Beenon soils in most places are on the upper margin of the slope; Absarokee soils are lower and are on foot slopes and fans. Both soils have loamy surface layers. Beenon has partially weathered bedrock above 20 inches, while Absarokee soils have bedrock between 20 and 40 inches.

The native vegetation that mainly occurs on the Absarokee soil is gambel oak, serviceberry, big sage, wheatgrasses, and native brome. The native (potential) vegetation on this soil consists of serviceberry and oakbrush, which are the major brush species. Snowberry and chokecherry are other principal shrub species. About 50 to 60 percent of the annual production is made up of grasses. Nodding brome, mountain brome, slender wheatgrass, western wheatgrass, and needlegrass are the major grass species. Elk sedge generally is the most frequently occurring plant. Major forb species include peavine, fleabane, western yarrow, and American vetch.

The native vegetation that mainly occurs on the Beenon soils is gambel oak, serviceberry, and big sage. Grasses include wheatgrasses, pine needlegrass and needle-and-thread. The native (potential) vegetation on this soil is dominated by such grasses as western wheatgrass, blue bunch wheatgrass, needle-and-thread, Indian ricegrass, prairie Junegrass, mountain muhly, and Idaho fescue. Big sagebrush, bitterbrush, and low rabbitbrush are principal shrubs. Significant forbs include iris, milkvetch, buckwheat, yarrow, and lupine.

FUGHES-BULKLEY

The Fughes-Bulkley association consists of deep, gently sloping to very steep, well-drained soils that have clayey subsoils, formed in clayey alluvium derived from shale and interbedded sandstones. They occur on fans, uplands and mountain slopes. Fughes soils occur somewhat lower in elevation than Bulkley soils because soil materials have been moved farther down the slope by water and gravity. Fughes soils have loamy surface layers and redder subsoils than Bulkley soils. Surface layers of Bulkley soils are clayey and may have weathered shale between 40 and 70 inches.

The native vegetation that mainly occurs on the Fughes soil is oak, serviceberry, Arizona fescue, and western wheatgrass. The native (potential) vegetation is the same as that described for the Delson and Cerro soils.

COCHETOPA-NORTHWATER

The Cochetopa-Northwater soils association consists of deep, moderately sloping, hilly and very steep, well-drained soils that have clayey subsoils. They were formed in old landslide deposits and glacial drifts from materials of igneous origin and occur on mountain slopes, valleys, and alluvial fans. Cochetopa and Northwater soils occur at about the same elevations and occupy similiar positions on the slope. Both soils have cobbly or stony surface layers. Cochetopa soils have less than 35 percent stone in the subsoil, while Northwater soils have more than 35 percent cobble and gravel in the subsoil.

The native vegetation that mainly occurs on the Cochetopa soil is aspen and scattered spruce, whose understory is dominated by fescues, bromes, needlegrasses, and wheatgrasses. The native (potential) vegetation is dominated by bunchgrasses. Thurber fescue is always present and usually dominant. Parry oatgrass is co-dominant in some places. Idaho fescue and big bluegrass may be present. Slender wheatgrass, nodding brome, and the needlegrasses are common secondary grasses. Forbs make up as much as 20 percent of the annual yield. Among the most common are aspen fleabane, American vetch, lupine, mature clovers, etc. Snowberry is a common shrub.

The main native vegetation and potential native vegetation on Northwater soils are as described above for the Cochetopa.

BADLAND-CHIPETA-PERSAYO

The Badland-Chipeta-Persayo soils association consists of very steep, nearly barren outcrops of silty calcareous shale and shallow, well drained, gently sloping to rolling clayey soils formed in material weathered from shale. Badland in most places occurs on steep or very steep back slopes. Chipeta and Persayo soils occur on rolling uplands and less sloping areas. Chipeta soils have silty clay surfaces and underlying layers; Persayo soils are silty clay loam. Both soils are less than 20 inches deep over shale.

The native vegetation that mainly occurs on the Chipeta soil is mat saltbush, Indian ricegrass, galleta, and woody shrubs. The native (potential) vegetation on the Chipeta soil is mainly gardner saltbush, mat saltbush, and shadscale. Squirreltail and Indian ricegrass are present in small amounts. Also on this site is a variety of forbs such as globemallow rabbitbrush, snakeweed, prickly pear, etc.

The main native vegetation occurring on the Persayo soil is mat saltbush, gardner saltbush, fourwing saltbush, and shadscale. The native (potential) vegetation on this Persayo is dominated by galleta. Other grasses include Indian ricegrass, squirreltail, needle-and-thread, and three-awn. Forbs include scarlet globemallow, buckwheat, sego lily, etc. Shrubs which occur on the site are shadscale, gardner saltbush, winterfat, and Douglas rabbitbrush.

BILLINGS-GULLIED LAND

The Billings-gullied land association consists of deep, nearly level to gently sloping, well-drained, loamy soils and areas severely damaged by gully erosion, formed in recent alluvium derived from silty calcareous shale. They occur on recent alluvial fans and valley filling slopes. Billings soils occur on the outer edge of valleys, and gullied land occurs near the center of the valley where runoff water accumulates. Billings soils are deep with silty clay loam surface and subsurface layers that are stratified with clay loams, sands, and gravel in the lower part. Gullied land has gullies 20 to 30 feet wide, that are deeply incised by water.

The main native vegetation occurring on the Billings soil is greasewood, shadscale, fourwing saltbush, and galleta grass. The native (potential) vegetation on this soil is principally alkali sacaton, saltgrass, western wheatgrass, fourwing saltbush, and greasewood. Other plants may include rabbitbrush, winterfat, shadscale, and gardner and mat saltbush.

Hydrologic Soil Groups

Hydrologic groupings indicate the general infiltration and water movement ability of soils. Three hydrologic soil groups occur in the ES area.

Group B consists of soils with moderate infiltration rates when thoroughly wetted, which are chiefly moderately deep (36 inches) to deep (60+ inches), and moderately well to well drained. Water is removed from the soil somewhat slowly to readily, but not rapidly. The texture of these soils ranges from moderately fine (loams, silty loams) to moderately coarse (loamy sand to sandy loams). These soils have a moderate rate of water transmission (1.25 to 3 inches per hour).

Group C consists of soils with a slow infiltration rate when thoroughly wetted, chiefly (1) soils with a layer that impedes the downward movement of water or (2) soils with moderately fine to fine textures (clay loams, silty clay) and a slow rate of water transmission (0.5 to 1.25 inches per hour).

Group D consists of soils with very slow infiltration rate when thoroughly wetted, chiefly (1) clay soils with high swelling potential, (2) soils with high permanent water tables, (3) soils with claypans or clay layers near the surface, and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission (less than 0.5 inch per hour).

In the ES area, the average potential infiltration rates for the hydrologic soils group are as follows: Group B, 2.13 inches per hour; Group C, 0.88 inch per hour; and Group D, 0.25 inch per hour (Gifford 1975). See map A-1 in appendix 2 for the geographical location of the hydrologic soil units in the ES area. The composition of each of these map units is shown in table 2-3.

Present Erosion Condition

The present erosion condition classes (soil surface factor or SSF) are an expression of current erosion activity based on field observation. Seven categories of surface features were evaluated to determine the present erosion condition class within representative sites throughout this area: soil movement, surface litter, surface rock, pedestalling, rills, flow pattern, and gullies. Five erosion condition classes were used to depict current erosion activity through numerical values: stable (SSF 0 to 20), slight (21 to 40), moderate (41 to 60), critical (61 to 80), and severe (91 to 100). Table 2-4 shows the present erosion condition classes by allotment.

Water Resources

Surface Water Quantity in the ES Area

The ES area is located in the western half of the Gunnison River basin of Colorado. It falls almost entirely within the North Fork, Smith Fork-Crystal, and Uncompahgre subbasins. (See map 2-3.) The average water supply contributed by

TABLE 2-3
HYDROLOGIC SOIL GROUPS: COMPOSITION OF UNITS SHOWN ON MAP A-1 (APPENDIX 2)

Map Unit	Composition a/
1	70% Group B; 30% Group D
2	100% Group B
3	70% Group C; 30% Group D
4	67% Group C; 33% Group B
5	100% Group D b/
6	100% Group C c/
7	60% Group C; 40% Group D
8	85% Group C; 15% Group D
9	80% Group C; 20% Group B

a/ Groups are defined in narrative under Hydrologic Soil Groups.
b/ This unit consists of soils that are moderately coarse textured over sandstone at depths generally less than 20 inches. Also included are shallow to moderately shallow soils that are fine textured over silty shales.
c/ This unit consists of soils developing in stony alluvium as well as fine textured soils developing from silty shales.

TABLE 2-4
PRESENT EROSION CONDITION CLASS BY ALLOTMENT

Allotment No. & Name	Acres NRL	Erosion Condition Classes				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
4001 Dominguez	58,335	-	35,615	22,720	-	-
4002 Lower Escalante	2,240	-	-	2,240	-	-
4005 Fall Cabin	360	-	180	180	-	-
4006 Dry Mesa	18,895	-	18,895	-	-	-
4007 Sawmill Mesa	12,095	-	-	12,095	-	-
4008 25 Mesa	10,405	-	-	10,405	-	-
4010 Monitor Mesa	15,735	-	11,615	4,120	-	-
4011 Lower Roubideau Canyon	480	-	-	480	-	-
4012 Canal	10,650	-	10,650	-	-	-
4013 Ben Lowe	5,490	-	-	5,490	-	-
4014 Joker	1,835	-	1,400	435	-	-
4015 White Ranch	415	-	415	-	-	-
4016 Wells Gulch	16,955	-	-	16,955	-	-
4017 Alkali Flats	27,830	-	1,010	26,820	-	-
4021 Point Creek	1,000	-	-	1,000	-	-
4022 Petrie Mesa	13,860	-	-	9,680	4,180	-
4024 Dirty George	2,385	-	385	2,000	-	-
4025 Ward Creek-Doughspoon	17,910	-	16,710	1,200	-	-
4026 Escalante Canyon	1,270	-	210	1,060	-	-
4501 Milk Creek	105	105	-	-	-	-
4502 Surface to Leroux	3,230	-	3,230	-	-	-
4503 Stingley Gulch	1,080	-	1,080	-	-	-
4504 Leroux Creek	2,555	-	-	2,555	-	-
4505 Juniper Knob	120	-	120	-	-	-
4506 Oak Mesa	1,350	-	530	220	600	-
4507 Jay Creek	9,205	-	1,620	7,585	-	-
4509 Upper Jay Creek	430	-	430	-	-	-
4511 Overland	160	-	160	-	-	-
4512 East Roatcap	30	-	30	-	-	-
4513 Stevens Gulch	6,555	-	2,285	2,535	1,735	-
4514 Upper Terror Creek	30	30	-	-	-	-
4515 Freeman Gulch	620	620	-	-	-	-
4516 North Fork	23,420	-	23,420	-	-	-
4517 Coal Gulch	7,720	7,720	-	-	-	-
4518 Pilot Creek	45	45	-	-	-	-
4519 Muddy Creek	500	500	-	-	-	-
4520 Spring Creek	120	120	-	-	-	-
4521 Stock Driveway	120	-	120	-	-	-
4522 Downing	120	120	-	-	-	-
4523 Williams Creek	110	110	-	-	-	-
4524 Deep Creek	160	160	-	-	-	-
4525 Anthracite Creek	1,115	-	615	500	-	-
4526 Crystal Creek	480	480	-	-	-	-
4527 Jumbo Mountain	4,970	-	995	3,975	-	-
4528 Oak Ridge	3,600	-	3,370	230	-	-
4529 Reynolds Creek	1,200	-	-	1,200	-	-
4530 North Fork South	3,185	-	2,305	880	-	-
4531 Popp Ranch	265	-	265	-	-	-
4532 McDonald Ranch	7,330	-	2,760	4,570	-	-
4535 Home Place	160	-	-	-	160	-
4536 West Young's Peak	160	-	-	-	160	-
4537 Young's Peak	2,520	-	-	2,520	-	-
4538 Missouri Flats	120	-	120	-	-	-
4539 Cottonwood Creek	120	-	120	-	-	-
4540 North Saddle Peak	240	-	-	240	-	-
4541 Sunshine Mesa	40	-	-	40	-	-
4543 South Saddle Peak	220	220	-	-	-	-
4548 Creek Bottom	185	185	-	-	-	-

TABLE 2-4
PRESENT EROSION CONDITION CLASS BY ALLOTMENT (cont.)

Allotment No. & Name	Acres NRL	Erosion Condition Classes				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
4549 Dry Creek	3,110	-	3,110	-	-	-
5002 Dedication Site	1,915	-	1,915	-	-	-
5003 Selig Canal	7,665	-	-	-	7,665	-
5008 Brush Point	18,205	-	1,125	12,905	4,175	-
5010 Dead Horse	955	860	95	-	-	-
5011 Gould Reservoir	2,825	-	2,825	-	-	-
5012 Cedar Point	620	-	620	-	-	-
5013 Iron Canyon	1,335	1,175	160	-	-	-
5014 Poison Springs	1,570	-	1,275	295	-	-
5015 Grizzly Gulch	1,930	-	1,930	-	-	-
5016 Black Canyon	440	-	-	440	-	-
5017 Green Mountain	20,825	-	10,490	10,335	-	-
5020 Black Ridge	6,875	-	-	6,875	-	-
5022 Rabbit Gulch	1,250	-	560	690	-	-
5025 Fruitland Mesa	80	-	-	80	-	-
5026 Star Nelson Airport	80	-	80	-	-	-
5027 Adobe	300	-	300	-	-	-
5028 Doug Creek	400	400	-	-	-	-
5029 Spring Gulch	1,430	1,430	-	-	-	-
5030 Bostwick Park	5,495	2,065	-	-	-	3,430
5033 Pinyon Springs	1,030	1,030	-	-	-	-
5036 Big Gulch	40	-	40	-	-	-
5037 Black Mesa	500	-	500	-	-	-
5038 Red Canyon	80	-	-	80	-	-
5039 Onion Valley	40	40	-	-	-	-
5040 Pine Ridge	80	-	80	-	-	-
5041 East Gould Reservoir	620	-	620	-	-	-
5043 Collins	200	-	200	-	-	-
5044 Big Pasture	200	-	200	-	-	-
5045 Black Bullet	90	-	-	90	-	-
5046 Big Gulch	440	-	440	-	-	-
5047 Mesa Creek	640	640	-	-	-	-
5048 Morrow Point	1,035	1,035	-	-	-	-
5049 Smith Fork	450	-	-	450	-	-
5050 Allen Reservoir	200	-	200	-	-	-
5502 Sandy Wash	7,530	-	490	7,040	-	-
5503 Green	450	-	-	450	-	-
5504 Roatcap	3,070	-	-	3,070	-	-
5505 Transfer	2,970	-	1,200	1,770	-	-
5507 Pipeline	19,190	-	15,705	-	3,485	-
5508 Government Springs	2,260	-	2,260	-	-	-
5509 Coal Creek	320	320	-	-	-	-
5510 Bald Hills	205	205	-	-	-	-
5511 Shavano Mesa	2,015	500	1,515	-	-	-
5512 Franklin Mesa	3,600	3,600	-	-	-	-
5513 Dry Creek Basin	5,425	-	5,425	-	-	-
5514 East Fork Dry Creek	135	-	-	135	-	-
5515 Olathe Reservoir	185	-	-	185	-	-
5516 Piney	8,335	-	2,860	5,475	-	-
5517 Spring Creek Canyon	440	440	-	-	-	-
5518 Dave Wood	2,565	-	835	1,730	-	-
5520 Lower Horsefly	10,365	-	1,710	2,575	6,080	-
5521 Highway 90	6,215	-	-	6,215	-	-
5522 Beaver Hill	19,785	-	9,893	9,892	-	-
5523 Horsefly	640	-	640	-	-	-
5524 Duckett Draw	275	-	-	275	-	-

TABLE 2-4
PRESENT EROSION CONDITION CLASS BY ALLOTMENT (cont.)

Allotment No. & Name	Acres NRL	Erosion Condition Classes				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
5525 Dry Creek	100	100	-	-	-	-
5529 Log Hill	4,345	-	4,345	-	-	-
5530 Billy Creek	3,995	-	3,995	-	-	-
5532 Burro Ridge	200	-	-	200	-	-
5533 Onion Lakes	630	-	630	-	-	-
5534 Shin Park	3,970	3,970	-	-	-	-
5535 Cedar Creek	240	-	240	-	-	-
5536 South Canal	2,115	-	2,115	-	-	-
5538 Rock Ditch	55	-	55	-	-	-
5540 Dry Gulch	4,860	-	2,420	2,440	-	-
5542 Bosgal	50	-	50	-	-	-
5543 Waugh	200	-	200	-	-	-
5544 Kelly	80	-	80	-	-	-
5545 Henshaw	170	-	-	170	-	-
5546 Waterdog Basin	400	-	400	-	-	-
5547 Slagle Pass	310	310	-	-	-	-
5548 Washboard Rock	760	760	-	-	-	-
5549 High Park	1,660	1,660	-	-	-	-
5551 Dexter Creek	65	65	-	-	-	-
5552 Dallas	240	-	240	-	-	-
5553 Fisher Creek	480	-	480	-	-	-
5555 Taylor Draw	325	-	325	-	-	-
5556 Burro Creek	120	-	120	-	-	-
5557 Alkali	485	-	485	-	-	-
5559 South Fork	120	-	120	-	-	-
5560 Cookie Tree	640	-	640	-	-	-
5561 East Fork	80	-	-	-	80	-
5562 Hillside	160	-	-	160	-	-
5563 Moonshine Park	230	-	230	-	-	-
5564 Gravel Pit	40	-	-	40	-	-
5565 Tommy Creek	120	-	120	-	-	-
5566 Cow Creek	520	520	-	-	-	-
5567 Busted Boiler	40	40	-	-	-	-
5568 Baldy	680	680	-	-	-	-
5569 Hairpin	500	-	500	-	-	-
5570 Cedar	2,125	-	2,125	-	-	-
5572 McKenzie Creek	110	-	110	-	-	-
5574 Tappan Creek	240	-	240	-	-	-
Unallotted Lands	13,550	-	6,775	6,775	-	-
TOTALS	525,775	32,260	236,998	224,767	28,320	3,430

each drainage in the three subbasins (1943–1960) is shown in table 2–5 (U.S. Department of Agriculture 1962).

The North Fork subbasin comprises about 800,000 acres of federal and private land. It includes the drainage area of the North Fork of the Gunnison River and its tributaries plus the Leroux, Currant, Surface, and Tongue Creek drainages. The subbasin is a complex water-supply area with over 160 lakes and reservoirs, largely on the Grand Mesa, which store water for late season use.

The 250,000 acre Smith Fork-Crystal subbasin is the smallest of the three subbasins in the ES area. The subbasin is composed of the Smith Fork, Iron Creek, and Crystal Creek drainages. Crawford and Gould reservoirs are the two major reservoirs in the area with several smaller lakes and reservoirs providing additional stream flow regulation.

The Uncompahgre subbasin is made up of nearly 960,000 acres of federal, state, and private land and includes the drainage area of the Uncompahgre River and Roubideau Creek. Water storage for late season use is provided by the hundreds of lakes, reservoirs, and stock tanks in the subbasin. However, additional water is imported from the Upper Gunnison subbasin.

Most streams in the ES area begin on national forest lands (NFL) and enter national resource lands (NRL) at the lower forest boundary. In some cases, the streams flow through canyons with sufficient land space in the bottoms to support small pastures, fields, or orchards. There, the land adjacent to the streams tends to be privately owned, while the surrounding lands are NRL. Much of this stream water is diverted for irrigation and never reaches the main valley floor (see table 2–6). Generally only those streams in canyon bottoms unsuitable for agriculture have not been diverted for irrigation, and there the adjacent land has remained NRL. The foothill lands give way to the major river valleys which are used by private landowners for agriculture. Any streams reaching the valley bottoms are immediately diverted for use in irrigation.

TABLE 2–6.—*Direct flow diversions for the Gunnison River Basin (1973–76)*

Year	Acre feet
1973	2,444,130
1974	1,914,892
1975	2,183,407
1976	1,867,115
Average	2,102,386

SOURCE: U.S. Department of Agriculture, ERS, USFS, SCS, Water and Related Land Resources, Gunnison River Basin, Colorado, 1962.

FACTORS INFLUENCING RUNOFF

Surface runoff on range lands occurs when a maximum amount of moisture has been absorbed by both vegetation (interception storage) and soils (soil moisture storage) and when the rate of precipitation exceeds the rate of moisture flow into the soil (infiltration rate) (Branson, Gifford, and Owen 1972). The volume of runoff depends upon the characteristics of each storm and watershed.

In the ES area, most runoff occurs in response to spring snow melt and high intensity summer thunderstorms. Peak discharges from summer thunderstorms are normally greater than those created by spring snow melt. Consequently, higher sediment yields are generally associated with the summer storms.

HYDROLOGIC ENVIRONMENT

Nine representative watersheds were chosen to evaluate the hydrologic environment of the ES area (map 2–4). Table 2–7 shows the area, orientation, aspect, elevation, average slope, hydraulic length, and mean stream gradient for each watershed, as well as the estimated effects on runoff and peak discharge of the most severe rainfall condition studied (a 24-hour storm, which occurs on the average of once every 50 years); the table also lists the allotments which occur in each watershed. (See appendix 1, figures A–1 to A–5, for average annual precipitation and mean annual snowfall.)

The hydrologic soil groups for the watersheds range from D with an average infiltration rate of 0.25 inch per hour to B with a rate of 2.13 inches per hour (see Soils).

The major vegetative classifications that fall within the representative watersheds are (1) desert shrubs (4,900 to 5,500 feet), (2) pinyon, juniper, sagebrush (5,800 to 8,500 feet), and (3) oakbrush, ponderosa pine (8,500 to 9,500 feet). Vegetative variations occur within each zone depending on topography, precipitation, and land use (see Vegetation).

TABLE 2-5
WATER SUPPLY, WESTERN HALF OF THE
GUNNISON RIVER BASIN (1943-60 AVERAGE)

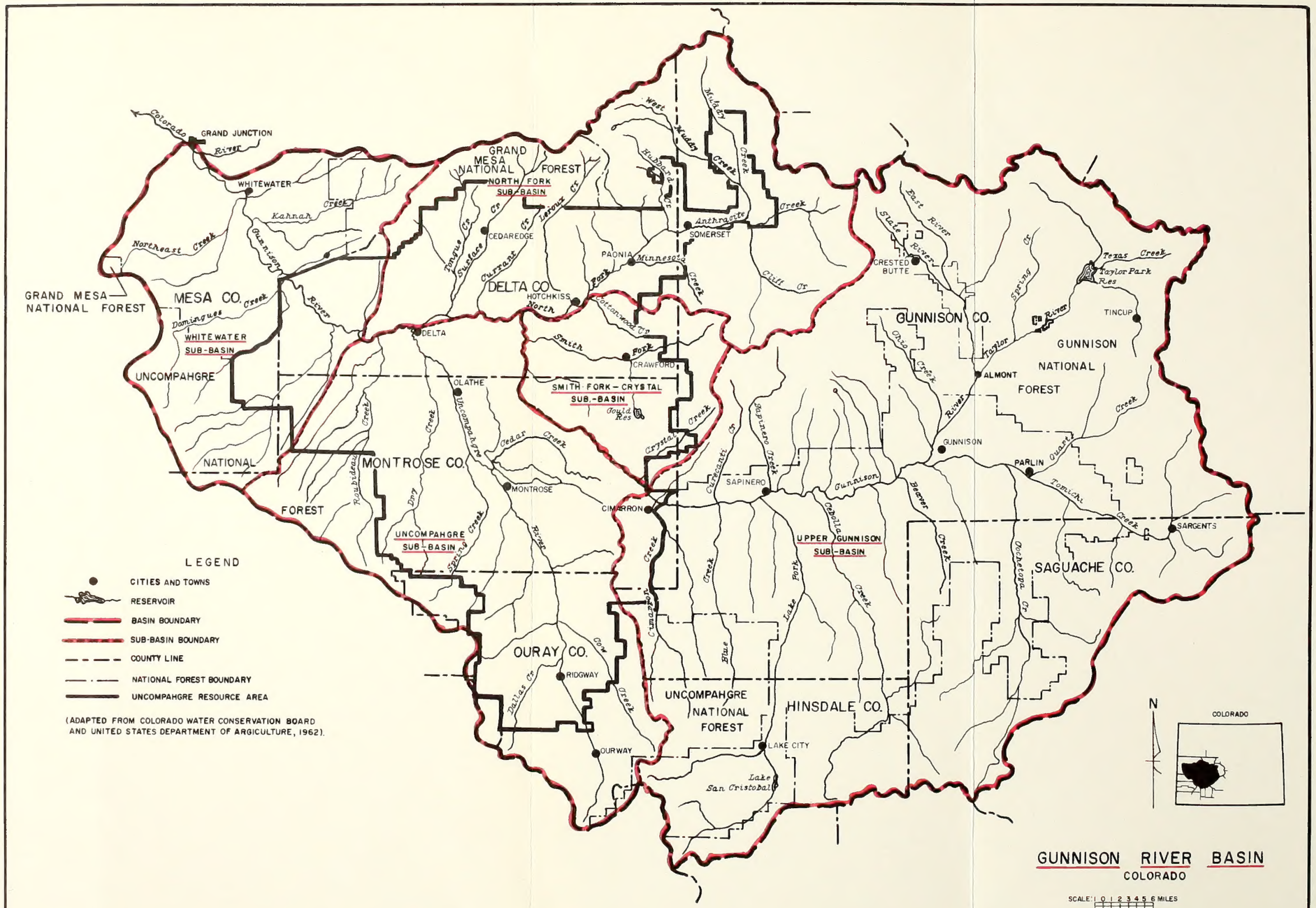
Subbasins & Drainages	Acre-Feet
NORTH FORK SUBBASIN a/	
North Fork near Somerset	318,100
Minnesota Creek and tributaries	16,900
Hubbard, Terror, Jay, and Roatcap Creeks	21,700
Leroux Creek	32,900
Currant Creek	4,600
Surface Creek, including Milk Creek	31,900
Young, Kiser, Cottonwood, Ward, and George Creeks	31,800
Oak and Doughspoon Creeks	4,000
Incidental Areas	2,000
City of Delta export	2,000
Overland Ditch import	5,400
SUBTOTAL b/	469,300
SMITH FORK-CRYSTAL SUBBASIN a,c/	
Smith Fork d/	34,800
Iron Creek e/	6,100
Crystal Creek f/	25,900
SUBTOTAL b/	66,800
UNCOMPAHGRE SUBBASIN g/	
Uncompahgre at Colona	178,200
Ouray County consumptive use	24,500
Minor tributaries and ungauged areas	29,800
Roubideau above Buttermilk	26,900
Imports:	
Cimarron Ditch	24,400
Gunnison Tunnel	335,100
City of Delta h/	2,000
SUBTOTAL b,h/	618,900
TOTAL	1,155,000

Source: U.S. Department of Agriculture, ERS, FS, SCS, Water and Related Land Resources, Gunnison River Basin, Colorado, 1962.
a/ Includes subbasin accretions to basin water supplies. Does not include main river flow entering subbasin, local return flows, or direct accretions to river flow, if any.
b/ Partly estimated by correlation.
c/ Does not include potential increase by proposed project diversion from Soap Park in Upper Gunnison subbasin.
d/ Includes Saddle Mountain, Gove, and Pilot Rock Canals.
e/ Excluding return flow, irrigation waste, and imported water.
f/ Includes Dyer Fork and Crystal Valley ditches.
g/ Return flow not included.
h/ City of Delta import included in North Fork subtotal and not included in Uncompahgre subtotal.

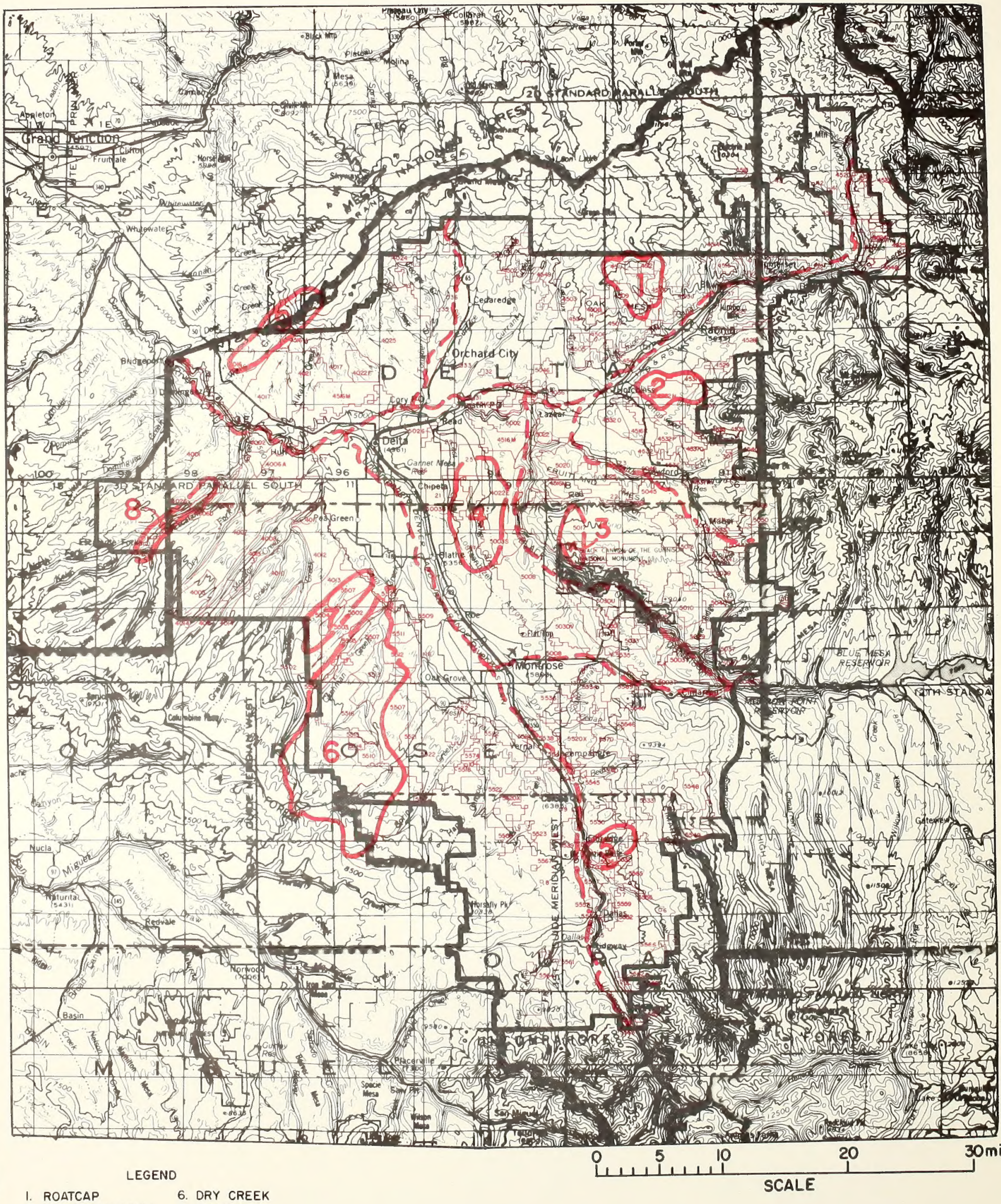
TABLE 2-7
THE NINE REPRESENTATIVE WATERSHEDS

Watershed & Allotments	Acreage	Area (Sq. Mi.)	Orientation a/	Aspect b/	Elevation (Ft.) Min	Max	Relief	Average Slope (%) c/	Hydraulic Length (mi.) d/	Mean Stream Gradient (%) e/	24-hr./50-yr. Storm (Under AMC II) f/ Runoff (In.)	Runoff (Ac.Ft.)	Peak Discharge (Cu.ft./sec.)
Upper Roatcap 4507 Jay Creek 4511 Overland 4512 East Roatcap 4513 Stevens Gulch	7,829	11.39	NS	E & W	6,590	9,180	2,590	31.4	5.3	9.0	0.19	115.41	75
McDonald Mesa 4530 McDonald Mesa 4531 Popp Ranch 4532 McDonald Ranch	3,782	5.91	E-W	W	5,460	7,000	1,540	8.4	5.6	5.0	0.19	115.41	85
Green Mountain 5017 Green Mountain	2,579	4.03	N-S	E & W	6,520	8,330	1,810	29.2	4.58	7.0	0.075	16.12	10
Peach Valley 4022 Petrie Mesa 5033 Pinyon Springs	12,307	19.23	N-S	W (eastern quarter; rest is flat)	5,220	6,820	1,600	14.5	8.8	3.0	0.51	523.25	912
Chaffee Gulch 5530 Billy Creek 5532 Burro Ridge	3,449	5.39	E-W	W	6,580	8,822	2,242	32.0	4.75	9.0	0.7	201.00	665
Dry Creek Basin 5505 Transfer 5507 Pipeline 5510 Bald Hills 5511 Shavano Mesa 5512 Franklin Mesa 5513 Dry Creek Basin 5514 East Fork Dry Creek 5515 Olathe Reservoir 5516 Piney	55,161	86.19	N-S	N (upper third); E & W (lower two-thirds)	5,600	9,900	4,300	19.0	24.74	3.0	0.3	1,379.00	1,060
Big Sandy 5502 Sandy Wash 5503 Green 5504 Roatcap 5507 Pipeline	6,016	9.4	NE-SW	E & W	5,660	7,299	1,639	7.21	7.54	4.0	0.65	325.00	545
Dry Mesa 4006 Dry Mesa	3,430	5.36	NE-SW	E & W	5,340	7,660	2,320	33.8	8.9	5.0	0.3	85.00	99
Wells Gulch 4016 Wells Gulch 4516 North Fork	7,424	11.6	N-S	S	5,180	9,800	4,620	22.1	9.3	9.0	0.8	494.00	1,200

a/ Orientation is the general direction in which the valley or channel bottom of each watershed is situated with respect to standard compass settings. N = north; S = south; E = east; W = west; NE = northeast; SW = southwest.
b/ Aspect is the general direction which the watershed side slopes face. N = north; S = south; E = east; W = west.
c/ Average slope was determined by calculating the average of several randomly selected slope measurements.
d/ Hydraulic length is the length of the longest stream channel in the watershed.
e/ Mean stream gradient is the average slope of the longest stream in the watershed.
f/ A 24-hour/50-year storm is an intense storm and an extreme storm event. AMC II = Antecedent Moisture Condition II, i.e., 0.5 to 1.5 inches of rain in the previous five days.



Map 2-3. Sub-Basins of the Gunnison



LEGEND

1. ROATCAP
2. MC DONALD MESA
3. GREEN MTN.
4. PEACH VALLEY
5. CHAFFEE
6. DRY CREEK
7. BIG SANDY
8. DRY MESA
9. WELLS GULCH

Note: Hydrologic characteristics of watersheds 6,7 & 8 are similar enough that their average can be used to represent the area west of the Gunnison River.

Map 2-4. Nine Representative Watersheds and Their Represented Areas

Surface Water Quality

Quality of surface waters in the ES area is dependent upon hydrologic characteristics, irrigation practices, geology, climate, seasonal and year-to-year trends in stream flow, land use, and hydraulic position within the Uncompahgre and Gunnison river basins. The quality of surface waters (lakes, streams, rivers) is inseparable from the quantity and flow timing of such waters. Quantitative factors, such as peak discharge, mean daily discharge, current velocity, and stream hydrographic characteristics (e.g., physical conditions, boundaries, and flow), definitely influence and in part control the concentration and discharge of chemical and biological substances which determine water quality.

Baseline data collection of water quality information is principally the responsibility of the U.S. Geological Survey (USGS), Water Resources Division. Unfortunately, due to a variety of factors, surface water quality records at the USGS data collection points cannot be related to the quality of runoff yielded from or flowing through NRL of the ES area.

Colorado's State Department of Health, Water Quality Control Division, in compliance with Public Law 92-500, has developed a monitoring network across the state, which includes one significant station in the ES area: North Fork of the Gunnison River below Hotchkiss (Secondary Station No. 100). Measurements at this station are significantly affected by NRL runoff (see appendix 3, table A-2). The remaining five state of Colorado stations in the ES area are not favorably located to provide data on NRL runoff.

Between May of 1959 and August of 1961, the U.S. Bureau of Reclamation (USBR) collected water quality data for the Gunnison River near Cory. These data are summarized in USGS Water Supply Papers 1645, 1745, and 1885. In addition, limited data on water quality within the ES area, collected by the Bureau of Land Management (BLM) during May of 1976, are on file in the Montrose District Office.

Although little information is available about the water quality of the streams draining and flowing through BLM lands of the ES area, the following generalizations are possible.

CHEMICAL QUALITY

The chemical quality of water in the streams of the ES area varies considerably. Total dissolved solids is the best composite indicator of chemical water quality. Characteristically, the concentration of dissolved solids nearly varies inversely to stream flow: it is highest at low stream flow and lowest at the higher discharges.

In the headwaters of the Gunnison and Uncompahgre rivers (Iorns, Hembrie, and Oakland 1965) the range between high and low discharges in dissolved solids concentration is relatively small. But in the downstream reaches, the maximum range in concentration increases in direct proportion to flow increases. This phenomenon, geoclimatic considerations, and inefficient irrigation practices combine to make salinity (or total dissolved solids) a problem in the Uncompahgre River basin. (U.S. Department of the Interior, USBR 1976)

Good salinity data for streams in the ES area are not available. However, a salinity study by the BLM (1976) on the Upper Colorado River Basin, to which the ES area is tributary, states that

> The concentration of salts in streams coming from NRL varies significantly. It was found that concentration of salts in streams originating from ground water on NRL ranged from approximately 3,000 to 5,000 mg/l (milligrams per liter). Concentration of salts in surface water, however, ranged from 500 to 2,000 mg/l, see BLM open file report previously cited.

The study also stated that the Gunnison River receives large quantities of salt from the North Fork and Uncompahgre River systems. Salinity discharges of the Gunnison, together with salt loading from irrigation return flow in Colorado's Grand Valley, have a great influence on the total salinity load of the Upper Colorado River (BLM 1976).

Colorado Water Quality Control Commission (Colorado Department of Health 1974) lists the Uncompahgre River as polluted with heavy metals and acid mine wastes in the area above Ridgway.

SEDIMENT YIELD

The suspended sediments carried in streams and rivers of the ES area represent a serious source of water pollution. For example, in 1891, Jordan reported that the Gunnison River at Delta was clear with a gravelly or sandy bottom, although in still places it was occasionally muddy. Today, even with the benefit of four reservoirs acting as upstream settling ponds, this river is very muddy at Delta.

Soils derived from marine shales and areas having annual precipitation of approximately 10 inches have been shown to have the highest annual sediment yields (Branson, Miller, and McQueen 1972; Langbein and Schumm 1958). This description fits much of the central portion of the ES area. Watersheds in the ES area have low water retention capacities, high erosion factors, and high sediment yields.

The sediment yield rates for the ES area were taken from the Sediment Yield Map for Colorado, published by the Colorado Land Use Commission (1974). Most of the quantitative data used to determine these yields were compiled by the Colorado Land Use Commission from dry reservoirs on small watersheds and were considered to reflect the average weight of volume sediment deposited in the reservoirs. Data for determining the sediment yield were obtained from a variety of sources: (1) a reservoir survey made by the SCS, USGS, and the Corps of Engineers; (2) suspected sediment load measurements made by the USGS, USBR, and Corps of Engineers; (3) estimates of sediment yields taken from the Pacific Southwest Inter-Agency Committee Procedures; (4) geologic maps; and (5) soils, vegetation, and land use maps prepared by the SCS.

The allotments of the ES area occur in four different sediment yield areas as shown on map 2-5. Very high sediment yields of 2 acre feet per square mile per year occur in Area 1. This is the equivalent of 5.6 tons per acre per year. (The procedure for converting acre feet per square mile per year to ton per acre per year is shown as a footnote to table 2-8.) The sediment yield from Area 2 is 0.75 acre foot per square mile per year or 2.1 tons per acre per year. Area 3 has a moderate yield of 0.4 acre foot per square mile per year or 1.1 tons per acre annually. Area 4 has a low sediment yield of 0.2 acre foot per square mile per year or 0.6 ton per acre annually. Area 5 has a very low yield of 0.1 acre foot per square mile per year or 0.3 ton per acre annually. Overall approximately 15 percent of the land in the ES area is in the very high yield category, 35 percent is in the high yield category, and 50 percent is in the moderate yield category. Table 2-8 shows the estimated sediment yield (tons per year) for each allotment.

Ground Water Resources

The ES area is bordered on the south and east by igneous rock. The volcanic and intrusive rocks are mainly basalt, andesite, and diorite, which make poor water-bearing zones unless highly fractured. In general the formation is moderately fractured, and several springs can be found throughout the formation. Another outcrop of the igneous formation is located along the western portion of the northern border. The entire formation is for the most part lacking in well developments due to the difficulty of drilling the hard rock.

The western portion of the ES area is mostly Dakota sandstone formation, which dips to the east-northeast at about 2 degrees (Anderson 1976). It is overlain in the central portion of the ES area by shale and sandstone (mostly Mancos shale). The exposed Dakota sandstone in the Uncompahgre Plateau is the principal recharge area for the confined artesian aquifer (water-bearing rock) found below the Mancos shale formations within the valley. The sandstone formation yields between about 10 and 80 gallons per minute, depending on well design and local conditions. Wells drilled in the valley reach the sandstone formation at depths of about 80 to 400 feet and yield 10 to 60 gallons per minute.

The Mancos shale formation found in the central and northeastern portions of the ES area yields minor amounts of water on a local basis. However, the water is generally of poor quality due to solution of the minerals in the shale formation (see Ground Water Quality below). The majority of the formation has very little potential for ground water development.

An outcrop of igneous and metamorphic rock composed of granites and schists is found in the Black Canyon of the Gunnison. The impervious formation is the basement complex upon which the other formations lie (Iorns 1965). The dense, consolidated formation has very little potential for ground water storage.

The fluvial and glaciofluvial deposits adjacent to the Uncompahgre and Gunnison rivers produce some of the highest yielding wells in the ES area, with well yields as high as 1,000 gallons per minute or more in some locations.

Ground Water Quality

The overall quality of the ground water in the ES area is considered to be slightly to moderately

TABLE 2-8
ESTIMATED ANNUAL SEDIMENT YIELD BY ALLOTMENT

Allotment	Total Yield (tons/year) a/	Allotment	Total Yield (tons/year) a/	Allotment	Total Yield (tons/year) a/
4001 Dominguez	137,374	4514 Upper Terror Creek	18	5003 Selig Canal	29,518
4002 Lower Escalante	4,704	4515 Freeman Gulch	372	5008 Brush Point	67,456
4005 Fall Cabin	708	4616 North Fork	37,386	5010 Dead Horse	1,051
4006 Dry Mesa	34,592	4517 Coal Gulch	7,718	5011 Gould Reservoir	3,108
4007 Sawmill Mesa	21,767	4518 Pilot Creek	27	5012 Cedar Point	682
4008 25 Mesa	17,692	4519 Muddy Creek	377	5013 Iron Canyon	2,269
4010 Monitor Mesa	28,321	4520 Spring Creek	72	5014 Poison Springs	2,983
4011 Lower Roubideau Canyon	1,008	4521 Stock Driveway	72	5015 Grizzly Gulch	2,123
4012 Canal	18,885	4522 Downing	72	5016 Black Canyon	484
4013 Ben Lowe	6,590	4523 Williams Creek	66	5017 Green Mountain	37,487
4014 Joker	1,558	4524 Deep Creek	96	5020 Black Ridge	14,435
4015 White Ranch	779	4525 Anthracite Creek	670	5022 Rabbit Gulch	2,629
4016 Wells Gulch	35,603	4526 Crystal Creek	408	5025 Fruitland Mesa	168
4017 Alkali Flats	58,447	4527 Jumbo Mountain	4,968	5026 Star Nelson Airport	168
4021 Point Creek	2,100	4528 Oak Ridge	4,320	5027 Adobe	330
4022 Petrie Mesa	26,335	4529 Reynolds Creek	1,440	5028 Doug Creek	240
4024 Dirty George	1,431	4530 North Fork South	4,777	5029 Spring Gulch	1,544
4025 Ward Creek-Doughspoon	34,000	4531 Popp Ranch	355	5030 Bostwick Park	15,108
4026 Escalante Canyon	2,036	4532 McDonald Ranch	13,923	5033 Pinyon Springs	1,237
4501 Milk Creek	62	4535 Home Place	336	5036 Big Gulch	44
4502 Surface to Leroux	3,390	4536 West Young's Peak	336	5037 Black Mesa	550
4503 Stingley Gulch	1,186	4537 Young's Peak	3,386	5038 Red Canyon	168
4504 Leroux Creek	3,216	4538 Missouri Flats	252	5039 Onion Valley	44
4505 Juniper Knob	132	4539 Cottonwood Creek	72	5040 Pine Ridge	88
4506 Oak Mesa	1,377	4540 North Saddle Peak	264	5041 East Gould Reservoir	495
4507 Jay Creek	7,826	4541 Sunshine Mesa	24	5043 Collins	220
4509 Upper Jay Creek	258	4543 South Saddle Peak	131	5044 Big Pasture	120
4511 Overland	96	4548 Creek Bottom	110	5045 Black Bullet	189
4512 East Roatcap	12	4549 Dry Creek	2,955	5046 Big Gulch	484
4513 Stevens Gulch	5,573	5002 Dedication Site	4,022	5047 Mesa Creek	384

Source: Sediment Yield Map for Colorado prepared by the Colorado Land Use Commission (1974).
a/ The following procedure was used for converting acre foot per square mile per year to ton per acre annual yield: (43,560 cubic feet/acre)(2) = 87,120 cubic feet

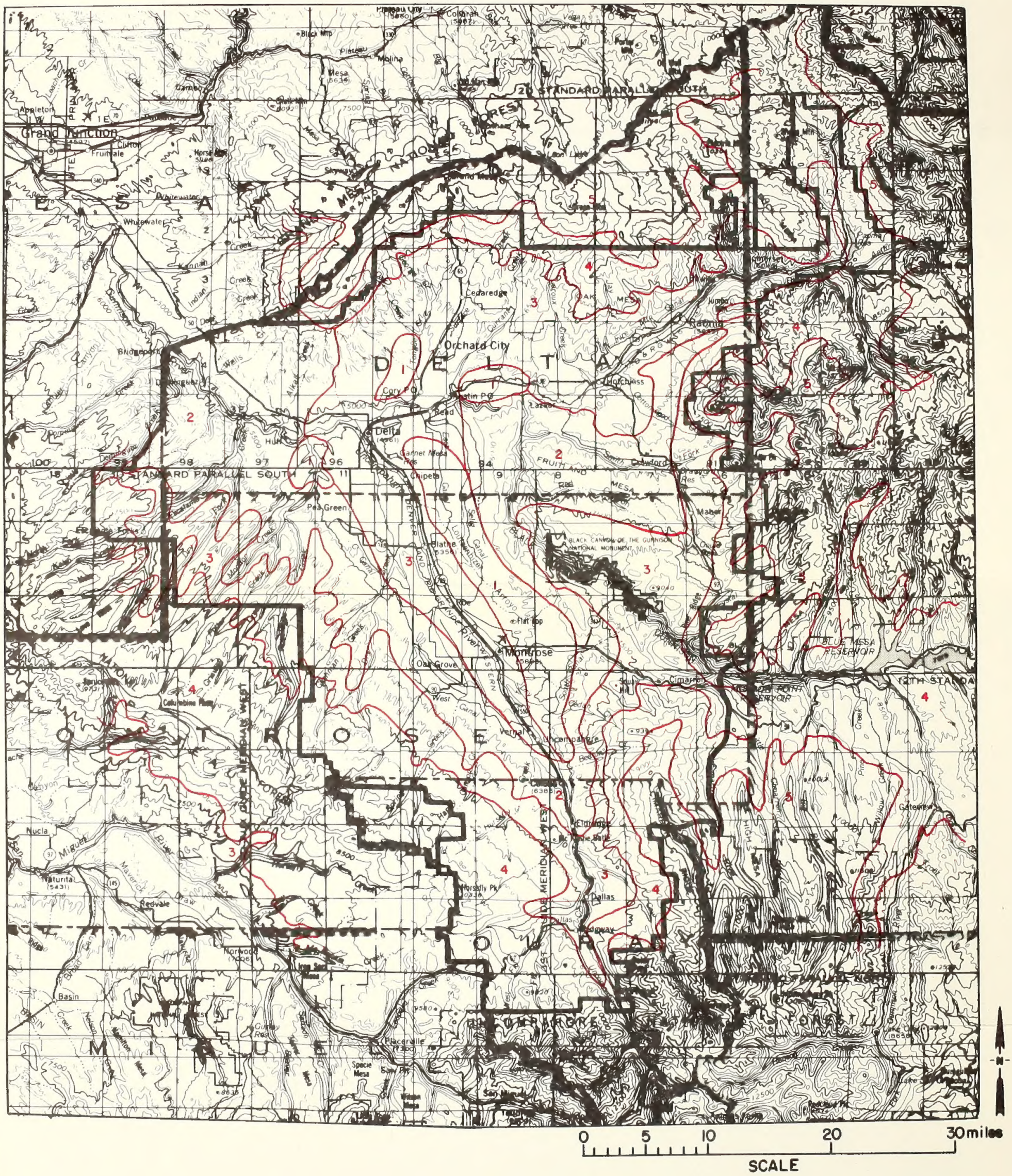
(87,120 cubic feet)(83 lbs/cubic feet) = 7,230,960 pounds

$$\frac{7,230,960 \text{ pounds}}{2,000 \text{ pounds/ton}} = 3,615.5 \text{ tons}$$

$$\frac{3,615.5 \text{ tons}}{640 \text{ acres}} = 5.65 \text{ tons/acre}$$

TABLE 2-8
ESTIMATED ANNUAL SEDIMENT YIELD BY ALLOTMENT (cont.)

Allotment	Total Yield (tons/year) a/	Allotment	Total Yield (tons/year) a/	Allotment	Total Yield (tons/year) a/
5048 Morrow Point	621	5543 Waugh	1,131		
5049 Smith Fork	269	5544 Kelly	168		
5050 Allen Reservoir	120	5545 Henshaw	952		
5502 Sandy Wash	10,360	5546 Waterdog Basin	560		
5503 Green	495	5547 Slagle Pass	94		
5504 Roatcap	3,530	5548 Washboard Rock	345		
5505 Transfer	4,158	5549 High Park	38		
5507 Pipeline	24,468	5551 Dexter Creek	264		
5508 Government Springs	3,610	5552 Dallas	264		
5509 Coal Creek	512	5553 Fisher Creek	525		
5510 Bald Hills	123	5555 Taylor Draw	358		
5511 Shavano Mesa	4,360	5556 Burro Creek	132		
5512 Franklin Mesa	5,762	5557 Alkali	534		
5513 Dry Creek Basin	10,846	5559 South Fork	132		
5514 East Fork Dry Creek	81	5560 Cookie Tree	706		
5515 Olathe Reservoir	111	5561 East Fork	480		
5516 Piney	8,208	5562 Hillside	72		
5517 Spring Creek Canyon	264	5563 Moonshine Park	139		
5518 Dave Wood	2,564	5564 Gravel Pit	24		
5520 Lower Horsefly	26,948	5565 Tommy Creek	72		
5521 Highway 90	4,149	5566 Cow Creek	312		
5522 Beaver Hill	20,774	5567 Busted Boiler	24		
5523 Horsefly	395	5568 Baldy	408		
5524 Duckett Draw	218	5569 Hairpin	550		
5525 Dry Creek	110	5570 Cedar	2,123		
5529 Log Hill	4,438	5572 McKenzie Creek	119		
5530 Billy Creek	5,873	5574 Tappan Creek	264		
5532 Burro Ridge	170	Unallotted Lands	29,323		
5533 Onion Lakes	189				
5534 Shin Park	13,895				
5535 Cedar Creek	323				
5536 South Canal	11,094				
5538 Rock Ditch	314				
5540 Dry Gulch	100				
5541 Squaw Hill	896				
5542 Bosgal	280				
		TOTAL	942,630		


Grand Junction
Appleton
Fruitvale
Clifton
Whitewater
Orchard City
Delta
Cedaredge
Paonia
Hotchkiss
Crawford
Austin
Cory
Eckert
Olathe
Chipeta
Pea Green
Montrose
Oak Grove
Cimarron
Gateway
Nucla
Naturita
Redvale
Norwood
Placerville
Dallas
Ridgway
Ute Mountain
Uncompahgre
Gunnison
Black Canyon of the Gunnison National Monument
Blue Mesa Reservoir
Fruita Mesa
Grand Mesa
Mesa
Plateau
Orchard Mesa
Cedar Mesa
Oak Mesa
Garnet Mesa
Specie Mesa
Dry Mesa
Roubideau
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saline (containing mineral salts): 1,000 to about 10,000 milligrams per liter of dissolved solids (Price and Waddell 1973). Wells located in the Mancos shale formation, Dakota sandstone, and valley fill deposits yield water considered saline by the Price and Waddell criteria.

The small amounts of water found in the Mancos shale are normally very saline due primarily to the marine deposits associated with that formation. Water in the Dakota formation generally contains 500 to 3,000 milligrams per liter of dissolved solids, and the principal ion pairs include sodium bicarbonate and sodium chloride. Locally, high concentrations of selenium and arsenic can be found in the Dakota sandstone formation (Anderson 1976). The USGS reported that

> Water in the valley-fill deposits commonly is hard and contains varying amounts of calcium, magnesium, bicarbonate, and sulfate. The water generally is more mineralized than that in adjacent streams. In some areas dissolved-solids content exceeds 1,000 mg/l (milligrams per liter) particularly where irrigation water leaches salts from underlying or adjacent rocks in the Mancos shale as in the Uncompahgre Valley. Salts also concentrate in water owing to evaporation in areas that are poorly drained where the water table is close to the land surface. (Boettcher 1972)

The occasional springs and wells found in the igneous and metamorphic rock formations usually yield good quality water. The water is low in dissolved solids, primarily because of the geochemical properties of the crystalline rocks and the high elevations of the formations. The water in the aquifer originates as rainfall or snowmelt at higher elevations and is not affected by the lower elevation marine deposits.

Natural discharge of ground water supplements stream runoff as baseflow. The dissolved solids in ground water discharged to the streams are a major part of the total salt load in the streams as shown in table 2-9 (Boettcher 1972).

Vegetation

Vegetative Types

There are thirteen broad vegetative types in the ES area. Map 2-6 shows their distribution in the area.

PINYON-JUNIPER

Pinyon-juniper (270,520 acres, 51.5 percent of NRL) is located in foothill and mesa areas below the mountain shrub type of the Uncompahgre Plateau, Grand Mesa, Gunnison Gorge uplift, North Fork Valley, and Cimarron Ridge. It is situated in an elevation range of 6,200 to 7,400 feet, where annual precipitation ranges from 10 to 16 inches.

The major overstory of this type is Colorado pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). The understory is generally dominated by grass species such as bottlebrush squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), and needle-and-thread (*Stipa comata*).

Stands of pinyon-juniper are interspersed with sagebrush parks composed of big sagebrush (*Artemisia tridentata*), black sagebrush (*A. nova*), and rabbitbrush (*Chrysothamnus lanceolatus*). In areas which have been chained, browse species such as common serviceberry (*Amelanchier alnifolia*) and mountain mahogany (*Cercocarpus montanus*) occur.

SALTBUSH

Saltbush (76,495 acres, 14.5 percent of NRL) is typically located between pinyon-juniper and irrigated croplands of the valleys. Annual precipitation averages below 10 inches. The dominant species is shadscale (*Atriplex confertifolia*). Other shrub species in this type are mat saltbush (*A. corrugata*) and four-wing saltbush (*A. canescens*). Grass understory common to the saltbush type includes galleta (*Hilaria jamesii*), blue grama (*Bouteloua gracilis*), and bottlebrush squirreltail. Rabbitbrush (*Chrysothamnus nauseosus*) and broom snakeweed (*Gutierrezia sarothrae*) are also found.

DESERT SHRUB

The greatest portion of the desert shrub type is located west of Delta at 6,200 feet or lower. Precipitation in this area is approximately 12 inches annually. Species common to this type (58,265 acres, 11.1 percent of NRL) are shadscale, prickly pear (*Opuntia* sp.), groundsel (*Senecio* sp.), galleta grass, and cheatgrass (*Bromus tectorum*).

MOUNTAIN SHRUB

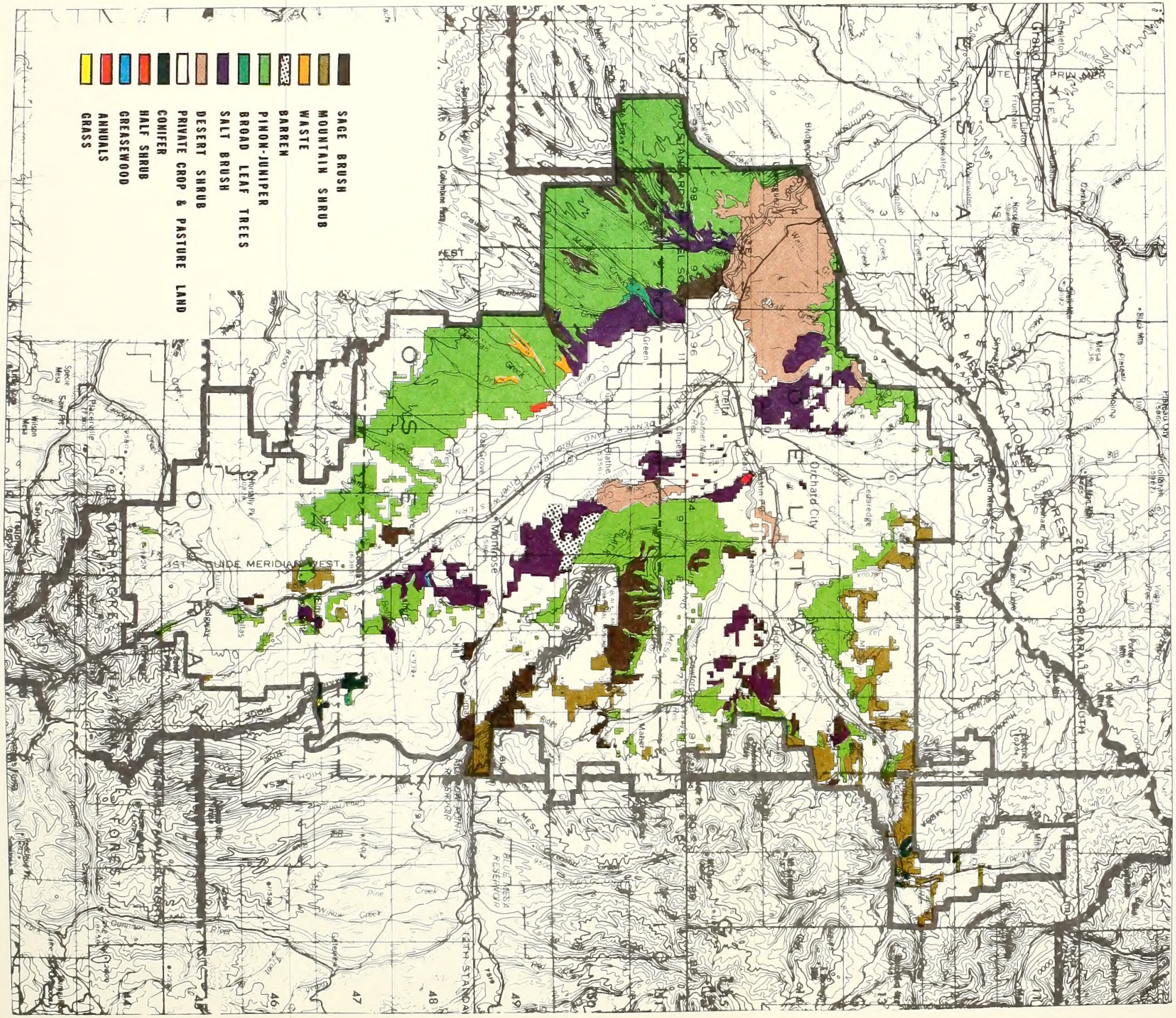
The mountain shrub type (53,230 acres, 10.1 percent of NRL) includes untimbered lands where shrubs other than sagebrush and rabbitbrush predominate. It occurs in areas of 14 to 18 inches of annual precipitation, which includes elevations of from about 7,000 to 9,000 feet. The major overstory species within this type are Gambel oak (*Quercus gambelii*), common serviceberry, and mountain mahogany. The understory is made up

TABLE 2-9
AVERAGE GROUND WATER CONTRIBUTION TO SELECTED MOUNTAIN STREAMS

	Station	Number of years of record	Ground-water discharge Percentage of total stream flow	Ground-water discharge Average annual (cfs) a/
09126000	Cimarron River near Cimarron	12	26	22
09128500	Smith Fork near Crawford	31	23	9
09130500	East Muddy Creek near Bardine	18	20	18
09134500	Leroux Creek near Cedaredge	27	16	7
09143000	Surface Creek near Cedaredge	27	16	7
09146400	West Fork Dallas Creek near Ridgway	11	32	4
09146500	East Fork Dallas Creek near Ridgway	13	28	7
09147100	Cow Creek near Ridgway	12	12	7

Source: Boettcher 1972.
a/ cfs = cubic feet per second.

Map 2-6. Vegetative Types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of bluegrass (*Poa* sp.), smooth brome (*Bromus inermis*), and arrowleaf balsamroot (*Balsamorhiza sagittata*).

SAGEBRUSH

The sagebrush type (48,925 acres, 9.3 percent of NRL) is generally adjacent to the pinyon-juniper type in the same elevation and precipitation zone in the ES area. The dominant species are big sagebrush and black sagebrush. Rabbitbrush also occurs in this type at lesser population levels. Understory species are blue grama, galleta grass, bottlebrush squirreltail, bluegrass, Indian ricegrass, and globemallow (*Sphaeralcea* sp.)

CONIFER

The conifer type (6,065 acres, 1.2 percent of NRL) is found at the higher elevations near NFL receiving 20 inches or more of precipitation annually. The elevation range of this type may be as low as 6,000 feet (near Paonia Reservoir) or as high as 11,000 feet (on Cimarron Ridge). Englemann spruce (*Picea englemanni*), alpine fir (*Abies lasiocarpa*), and Douglas fir (*Pseudotsuga menziesii*) are the major overstory species; ponderosa pine (*Pinus ponderosa*) makes up a lesser part of the type's overstory. Understory species are American vetch (*Vicia americana*), monkshood (*Aconitum columbianum*), sedge (*Carex* sp.), and thurber fescue (*Festuca thurberi*). Aspen is usually associated with the conifer type.

BARREN AND WASTE

The barren and waste types (6,505 acres, 1.2 percent of NRL) include areas of practically no natural vegetation or areas so rough or inaccessible as to make their future grazing use improbable.

HALFSHRUBS, ANNUALS, AND GREASEWOOD

These three types (2,430 acres, 0.5 percent of NRL) are located generally in the lower elevation areas below 6,200 feet where some surface disturbance of the soil has occurred, for example, because of sheep and cattle holding areas or mineral exploration activities. The main species present in the halfshrub type are broom snakeweed, wild daisy (*Erigeron*), cheatgrass, and blue grama. The annual type is composed of cheatgrass and numerous annual forbs, shadscale, and galleta grass. Greasewood type is predominantly greasewood (*Sarcobatus vermiculatus*), phlox (*Phlox* spp.), and cheatgrass.

BROADLEAF TREES

The broadleaf tree type (2,110 acres, 0.4 percent of NRL) is located mainly along higher elevation drainages and lower elevation perennial streams. Major tree species for this type are quaking aspen (*Populus tremuloides*) and cottonwood (*Populus* sp.). The aspen is often interspersed in the conifer type throughout this area.

GRASS

Areas that consist of the grassland type (1,230 acres, 0.2 percent of NRL) have been cleared and seeded to various species of wheatgrass (*Agropyron*) and thurber fescue. These grassland areas form open parks in pinyon-juniper and conifer types.

Vegetative Condition

Range condition—good, fair, and poor—is used to describe the condition of the various vegetative types; it relates the current condition of the range to the potential of which the particular area is capable. Map 2-7 shows the vegetative range condition in the ES area. Table 2-10 lists total acreage of NRL and acreage by condition classes and trend for each vegetative type aggregated by allotment. (Refer to appendix 4 for a discussion of the method used to assign range condition classes in the ES area.)

Table 2-11 indicates present and potential vegetative production in animal unit months (AUMs), present vegetative density, and present composition of key species for each vegetative type aggregated by allotment. A more detailed breakdown by soil association, allotment, and pasture is available on request from the Montrose District BLM office, as is a list of the plant species in the ES area. For a discussion of methodology and data base, see appendix 4.

Poisonous and Noxious Plants

Poisonous and noxious plants are not a major problem, but some are scattered throughout the ES area. They are larkspur (*Delphinium*), lupine (*Lupinus*), greasewood, halogeton (*Halogeton glomeratus*), monkshood, and oakbrush. Larkspur, lupine, greasewood, and oakbrush are poisonous to cattle in the spring and early summer. Oakbrush, which causes the greatest losses (two or three cows per year), is poisonous after a late frost. Lupine, monkshood, and halogeton are poisonous to sheep in the spring.

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
4001 Dominguez				-	58,335	-	58,335
Pinyon-Juniper	-	31,075	14,780				
Saltbush	-	2,240	-				
Desert Shrub	-	220	7,940				
Sagebrush	2,080	-	-				
4002 Lower Escalante				-	2,240	-	2,240
Pinyon-Juniper	-	1,145	-				
Saltbush	-	80	-				
Desert Shrub	-	-	470				
Sagebrush	-	-	545				
4005 Fall Cabin				360	-	-	360
Pinyon-Juniper	-	360	-				
4006 Dry Mesa:							
A Escalante Subunit				-	-	2,280	2,280
Saltbush	-	1,480	-				
Sagebrush	-	120	680				
B Dry Mesa Subunit				5,260	-	10,905	16,165
Pinyon-Juniper	1,235	6,725	-				
Saltbush	-	1,680	-				
Sagebrush	4,205	2,320	-				
C Smith Ranch Subunit				-	150	-	150
Pinyon-Juniper	-	150	-				
D Escalante Subunit				-	-	300	300
Pinyon-Juniper	-	300	-				
4007 Sawmill Mesa				5,055	-	7,040	12,095
Pinyon-Juniper	1,080	3,040	6,935				
Saltbush	-	800	-				
Sagebrush	-	-	240				
4008 25 Mesa				2,560	5,345	2,500	10,405
Pinyon-Juniper	-	-	7,565				
Saltbush	-	2,320	-				
Broadleaf Trees	360	160	-				
4010 Monitor Mesa				-	-	15,735	15,735
Pinyon-Juniper	-	2,200	11,335				
Sagebrush	-	1,760	-				
Broadleaf Trees	-	-	440				
4011 Lower Roubideau Canyon				-	-	480	480
Broadleaf Trees	-	-	480				
4012 Canal				1,860	-	8,790	10,650
Pinyon-Juniper	-	1,600	2,690				
Saltbush	-	-	6,360				
4013 Ben Lowe				5,490	-	-	5,490
Pinyon-Juniper	-	1,515	240				
Saltbush	-	-	2,855				
Sagebrush	-	880	-				
4014 Joker				1,835	-	-	1,835
Pinyon-Juniper	-	490	1,345				
4015 White Ranch				415	-	-	415
Pinyon-Juniper	-	-	415				
4016 Wells Gulch				-	16,955	-	16,955
Pinyon-Juniper	1,060	-	-				
Desert Shrub	-	5,030	10,865				
4017 Alkali Flats				-	26,820	1,010	27,830
Pinyon-Juniper	-	5,300	1,040				
Saltbush	-	1,695	2,830				
Desert Shrub	-	620	12,785				
Mountain Shrub	-	840	-				
Sagebrush	-	-	2,720				
4021 Point Creek				-	-	1,000	1,000
Desert Shrub	-	520	480				
4022 Petrie Mesa:							
E Peach Valley Subunit				-	11,035	-	11,035
Pinyon-Juniper	6,805	-	-				
Saltbush	-	-	1,130				
Desert Shrub	-	-	3,100				
F Petrie Mesa Subunit				-	2,825	-	2,825
Saltbush	-	-	1,745				
Desert Shrub	-	-	1,080				
4024 Dirty George				-	2,385	-	2,385
Pinyon-Juniper	-	2,030	-				
Mountain Shrub	-	355	-				
4025 Ward Creek-Doughspoon				-	-	17,910	17,910
Pinyon-Juniper	-	3,180	1,050				
Saltbush	-	2,600	9,720				
Desert Shrub	-	615	745				
4026 Escalante Canyon				-	-	1,270	1,270
Pinyon-Juniper	-	900	160				
Saltbush	-	210	-				
4501 Milk Creek				-	105	-	105
Mountain Shrub	105	-	-				

Note: Data summarized from pasture-specific analysis available upon request from the Montrose District Office.
Range trend is taken from current trend studies and apparent trend information in the AMP's.
Range condition information was compiled by the Uncompahgre Basin Resource Area, Phase I Watershed Study (1975).

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
4502 Surface to Leroux				-	3,230	-	3,230
Pinyon-Juniper	60	1,590	-				
Mountain Shrub	1,580	-	-				
4503 Stingley Gulch				1,080	-	-	1,080
Pinyon-Juniper	-	930	-				
Mountain Shrub	-	150	-				
4504 Leroux Creek				530	435	1,590	2,555
Pinyon-Juniper	-	1,510	-				
Mountain Shrub	-	1,045	-				
4505 Juniper Knob				-	120	-	120
Pinyon-Juniper	-	-	120				
4506 Oak Mesa:							
G Subunit 1				-	-	600	600
Pinyon-Juniper	-	600	-				
H Subunit 2				440	90	220	750
Pinyon-Juniper	-	200	-				
Mountain Shrub	-	550	-				
4507 Jay Creek				1,380	1,540	6,285	9,205
Pinyon-Juniper	-	7,070	-				
Mountain Shrub	-	2,135	-				
4509 Upper Jay Creek				-	430	-	430
Pinyon-Juniper	-	100	-				
Mountain Shrub	-	330	-				
4511 Overland				-	160	-	160
Mountain Shrub	-	160	-				
4512 East Roatcap				-	30	-	30
Mountain Shrub	-	30	-				
4513 Stevens Gulch:							
I Roatcap Creek Subunit				600	1,325	195	2,120
Pinyon-Juniper	-	750	-				
Mountain Shrub	-	1,190	-				
Sagebrush	-	180	-				
J Terror Creek Subunit				600	1,980	1,855	4,435
Pinyon-Juniper	200	1,625	-				
Mountain Shrub	1,395	1,135	-				
Sagebrush	-	80	-				
4514 Upper Terror Creek				-	30	-	30
Mountain Shrub	30	-	-				
4515 Freeman Gulch				-	620	-	620
Pinyon-Juniper	-	120	-				
Mountain Shrub	495	5	-				
4516 North Fork:							
K South-of-Hotchkiss							
Subunit				-	-	1,395	1,395
Saltbush	-	-	645				
Sagebrush	-	715	35				
L Hubbard Subunit				-	1,705	-	1,705
Pinyon-Juniper	25	885	-				
Mountain Shrub	395	400	-				
M Deer Basin Subunit				1,240	7,565	11,515	20,320
Pinyon-Juniper	960	4,075	-				
Saltbush	-	600	1,390				
Desert Shrub	-	2,890	10,125				
Annuals	280	-	-				
4517 Coal Gulch				-	7,720	-	7,720
Pinyon-Juniper	-	200	-				
Mountain Shrub	5,980	640	-				
Conifer	900	-	-				
4518 Pilot Creek				-	45	-	45
Mountain Shrub	45	-	-				
4519 Muddy Creek				500	-	-	500
Mountain Shrub	390	-	-				
Sagebrush	110	-	-				
4520 Spring Creek				-	120	-	120
Mountain Shrub	120	-	-				
4521 Stock Driveway				-	120	-	120
Mountain Shrub	120	-	-				
4522 Downing				-	120	-	120
Mountain Shrub	120	-	-				
4523 Williams Creek				-	110	-	110
Mountain Shrub	80	30	-				
4524 Deep Creek				-	160	-	160
Mountain Shrub	15	-	-				
Conifer	145	-	-				
4525 Anthracite Creek				-	710	405	1,115
Mountain Shrub	-	1,040	-				
Conifer	-	25	-				
Broadleaf Trees	-	50	-				
4526 Crystal Creek				-	480	-	480
Mountain Shrub	445	-	-				
Conifer	35	-	-				

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
4527 Jumbo Mountain				-	2,425	2,545	4,970
Pinyon-Juniper	-	1,535	330				
Saltbush	-	-	690				
Mountain Shrub	-	1,825	-				
Sagebrush	-	-	300				
Conifer	-	30	-				
Broadleaf Trees	-	260	-				
4528 Oak Ridge				-	3,600	-	3,600
Pinyon-Juniper	-	230	-				
Mountain Shrub	390	2,905	-				
Sagebrush	-	75	-				
4529 Reynolds Creek				-	-	1,200	1,200
Pinyon-Juniper	45	175	-				
Mountain Shrub	620	-	-				
Sagebrush	-	360	-				
4530 McDonald Mesa				3,185	-	-	3,185
Pinyon-Juniper	-	1,945	-				
Saltbush	-	-	880				
Sagebrush	-	360	-				
4531 Popp Ranch				-	-	265	265
Pinyon-Juniper	-	100	-				
Sagebrush	-	165	-				
4532 McDonald Ranch:							
N Lambing Shed Subunit				4,640	-	-	4,640
Pinyon-Juniper	-	200	-				
Saltbush	-	-	2,880				
Sagebrush	-	1,560	-				
O South-of-Town Subunit				2,155	-	-	2,155
Saltbush	-	-	2,155				
P Harrington Subunit				535	-	-	535
Saltbush	-	20	515				
4535 Home Place				-	-	160	160
Saltbush	-	-	160				
4536 West Young's Peak				-	-	160	160
Pinyon-Juniper	-	110	-				
Saltbush	-	50	-				
4537 Young's Peak:							
Q Young's Peak Subunit				-	2,260	-	2,260
Pinyon-Juniper	-	2,260	-				
R Crawford Subunit				-	260	-	260
Pinyon-Juniper	-	260	-				
4538 Missouri Flats				-	120	-	120
Mountain Shrub	-	120	-				
4539 Cottonwood Creek				-	120	-	120
Mountain Shrub	-	120	-				
4540 North Saddle Peak				-	240	-	240
Mountain Shrub	240	-	-				
4541 Sunshine Mesa				-	-	40	40
Pinyon-Juniper	-	40	-				
4543 South Saddle Peak				-	220	-	220
Pinyon-Juniper	-	220	-				
4548 Creek Bottom				-	185	-	185
Conifer	175	-	-				
Broadleaf Trees	10	-	-				
4549 Dry Creek				-	3,110	-	3,110
Pinyon-Juniper	-	1,540	-				
Mountain Shrub	360	1,210	-				
5002 Dedication Site				-	1,915	-	1,915
Pinyon-Juniper	-	1,915	-				
5003 Selig Canal:							
S Selig Canal Subunit				-	5,660	-	5,660
Pinyon-Juniper	1,260	-	-				
Saltbush	-	-	4,400				
T Rawhide-Coffeepot Subunit				-	2,005	-	2,005
Pinyon-Juniper	1,405	-	-				
Mountain Shrub	-	-	600				
5008 Brush Point				-	-	18,205	18,205
Pinyon-Juniper	1,120	4,650	-				
Saltbush	-	-	8,260				
Barren	-	-	4,175				
5010 Dead Horse				955	-	-	955
Mountain Shrub	-	860	-				
Sagebrush	-	95	-				
5011 Gould Reservoir				-	2,825	-	2,825
Mountain Shrub	-	2,595	-				
Sagebrush	-	230	-				
5012 Cedar Point				-	-	620	620
Pinyon-Juniper	-	-	480				
Mountain Shrub	-	110	-				
Sagebrush	-	30	-				

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
5013 Iron Canyon				-	1,335	-	1,335
Pinyon-Juniper	-	15	-				
Mountain Shrub	-	970	-				
Sagebrush	-	190	160				
5014 Poison Spring				1,570	-	-	1,570
Pinyon-Juniper	-	-	295				
Mountain Shrub	-	-	1,090				
Sagebrush	-	-	185				
5015 Grizzly Gulch				-	-	1,930	1,930
Mountain Shrub	880	-	-				
Sagebrush	730	-	320				
5016 Black Canyon				-	-	440	440
Mountain Shrub	-	-	375				
Sagebrush	-	-	65				
5017 Green Mountain				-	-	20,825	20,825
Pinyon-Juniper	1,530	4,195	4,610				
Mountain Shrub	4,830	-	-				
Sagebrush	630	4,440	590				
5020 Black Ridge				6,875	-	-	6,875
Pinyon-Juniper	-	845	4,790				
Sagebrush	-	1,240	-				
5022 Rabbit Gulch				-	1,250	-	1,250
Pinyon-Juniper	-	690	-				
Sagebrush	535	25	-				
5025 Fruitland Mesa				-	80	-	80
Pinyon-Juniper	-	80	-				
5026 Star Nelson Airport				-	-	80	80
Saltbush	-	-	80				
5027 Adobe				-	-	300	300
Pinyon-Juniper	-	-	205				
Sagebrush	-	-	95				
5028 Doug Creek				-	400	-	400
Pinyon-Juniper	-	-	400				
5029 Spring Gulch				-	1,430	-	1,430
Mountain Shrub	-	50	665				
Sagebrush	-	-	605				
Conifer	-	-	75				
Broadleaf Trees	-	-	35				
5030 Bostwick Park:							
U Black Canyon-Jones							
Draw Subunit				-	1,655	-	1,655
Pinyon-Juniper	-	1,425	-				
Mountain Shrub	-	190	40				
V Adobe South Subunit				-	3,480	-	3,480
Pinyon-Juniper	-	-	50				
Saltbush	-	-	3,430				
W Bostwick Park Subunit				-	360	-	360
Pinyon-Juniper	-	360	-				
5033 Pinyon Springs				-	1,030	-	1,030
Pinyon-Juniper	-	670	-				
Mountain Shrub	-	-	360				
5036 Big Gulch				-	40	-	40
Desert Shrub	-	-	40				
5037 Black Mesa				-	500	-	500
Mountain Shrub	360	-	-				
Conifer	140	-	-				
5038 Red Canyon				-	80	-	80
Pinyon-Juniper	-	-	80				
5039 Onion Valley				-	40	-	40
Mountain Shrub	-	40	-				
5040 Pine Ridge				-	80	-	80
Mountain Shrub	-	60	-				
Broadleaf Trees	-	20	-				
5041 East Gould Reservoir				-	620	-	620
Sagebrush	-	420	200				
5043 Collins				-	200	-	200
Pinyon-Juniper	-	-	200				
5044 Big Pasture				-	200	-	200
Pinyon-Juniper	-	-	120				
Sagebrush	-	-	80				
5045 Black Bullet				-	90	-	90
Pinyon-Juniper	-	-	90				
5046 Big Gulch				-	-	440	440
Pinyon-Juniper	-	-	60				
Desert Shrub	-	-	380				

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

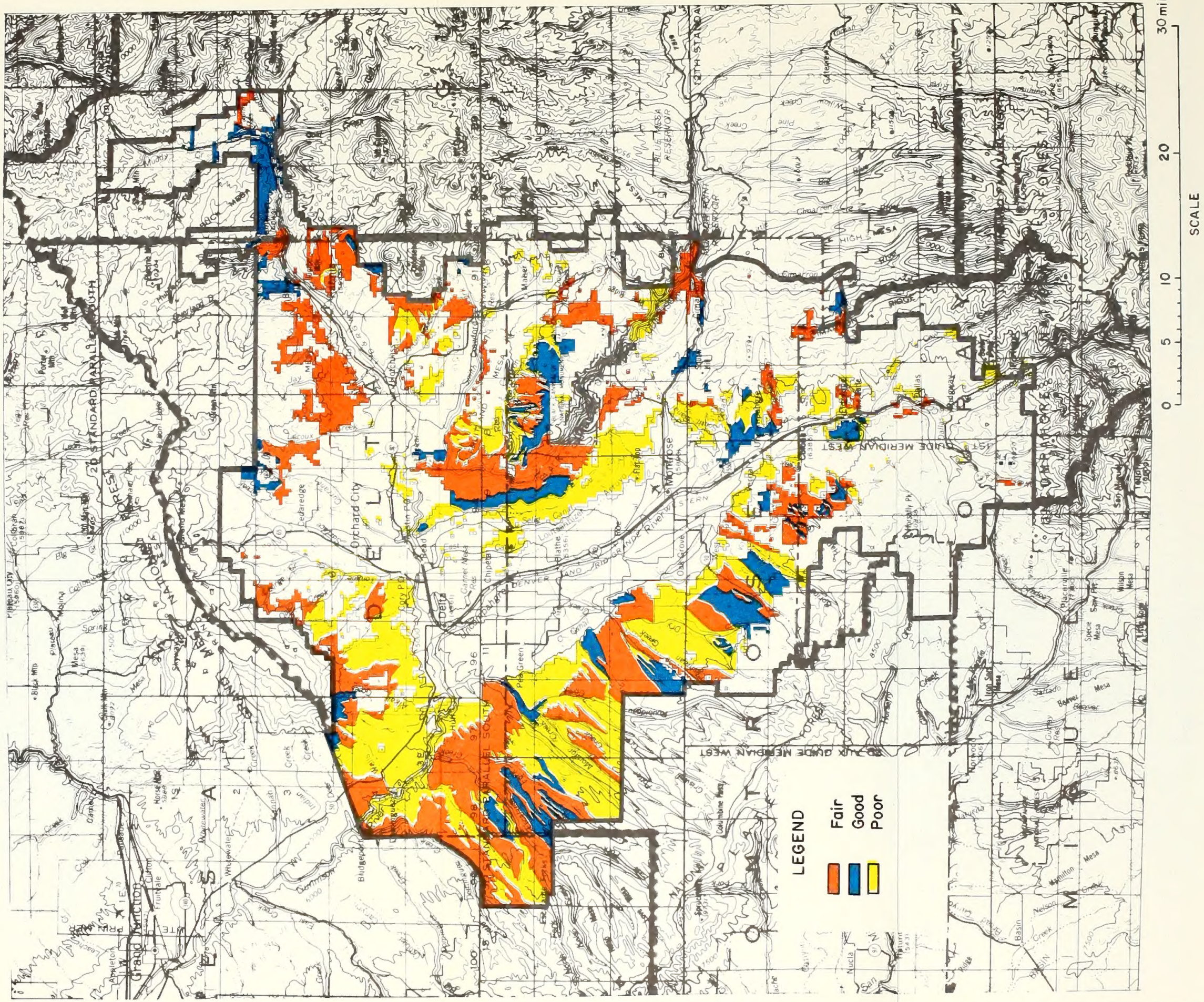
Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
5047 Mesa Creek				-	640	-	640
Mountain Shrub	-	300	-				
Conifer	-	340	-				
5048 Morrow Point				-	1,035	-	1,035
Mountain Shrub	-	155	-				
Conifer	-	880	-				
5049 Smith Fork				-	450	-	450
Pinyon-Juniper	-	450	-				
5050 Allen Reservoir				-	200	-	200
Pinyon-Juniper	-	-	150				
Sagebrush	-	-	50				
5502 Sandy Wash				-	7,530	-	7,530
Pinyon-Juniper	1,720	4,150	40				
Waste	-	1,130	490				
5503 Green				-	450	-	450
Pinyon-Juniper	-	450	-				
5504 Roatcap				-	3,070	-	3,070
Pinyon-Juniper	-	1,960	-				
Sagebrush	50	500	-				
Grass	560	-	-				
5505 Transfer				-	2,970	-	2,970
Pinyon-Juniper	1,250	930	210				
Waste	-	-	580				
5507 Pipeline				2,720	16,470	-	19,190
Pinyon-Juniper	6,520	5,125	7,305				
Halfshrub	240	-	-				
5508 Government Springs				2,260	-	-	2,260
Pinyon-Juniper	580	890	790				
5509 Coal Creek				-	320	-	320
Halfshrub	320	-	-				
5510 Bald Hills				-	205	-	205
Mountain Shrub	90	-	-				
Sagebrush	115	-	-				
5511 Shavano Mesa				500	-	1,515	2,015
Pinyon-Juniper	-	605	-				
Sagebrush	-	135	-				
Halfshrub	125	1,150	-				
5512 Franklin Mesa				-	-	3,600	3,600
Pinyon-Juniper	-	225	2,840				
Sagebrush	-	60	395				
Grass	-	80	-				
5513 Dry Creek Basin				-	-	5,425	5,425
Pinyon-Juniper	-	-	3,645				
Sagebrush	-	-	1,780				
5514 East Fork Dry Creek				-	135	-	135
Pinyon-Juniper	-	-	30				
Mountain Shrub	-	-	5				
Sagebrush	-	-	95				
Broadleaf Trees	-	-	5				
5515 Olathe Reservoir				-	-	185	185
Pinyon-Juniper	100	-	-				
Mountain Shrub	-	-	85				
5516 Piney				6,525	-	1,810	8,335
Mountain Shrub	-	2,195	900				
Sagebrush	-	-	5,240				
5517 Spring Creek				-	-	440	440
Pinyon-Juniper	-	-	440				
5518 Dave Wood				-	2,565	-	2,565
Pinyon-Juniper	-	440	1,290				
Sagebrush	-	820	15				
5520 Lower Horsefly:							
X Lower Horsefly Subunit				1,600	3,265	810	5,675
Pinyon-Juniper	480	2,430	1,180				
Saltbush	-	-	680				
Sagebrush	-	220	685				
Y Dry Cedar Subunit				1,040	3,650	-	4,690
Pinyon-Juniper	-	-	540				
Saltbush	4,150	-	-				
5521 Highway 90				3,040	-	3,175	6,215
Pinyon-Juniper	860	3,800	1,555				
5522 Beaver Hill				5,100	10,085	4,600	19,785
Pinyon-Juniper	5,100	7,425	7,260				
5523 Horsefly				-	640	-	640
Pinyon-Juniper	-	415	225				
5524 Duckett Draw				-	275	-	275
Pinyon-Juniper	-	-	20				
Sagebrush	-	-	255				
5525 Dry Creek				-	100	-	100
Pinyon-Juniper	-	25	-				
Grass	-	75	-				

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
5529 Log Hill				2,745	1,600	-	4,345
Pinyon-Juniper	2,745	-	80				
Mountain Shrub	-	-	1,520				
5530 Billy Creek				-	3,995	-	3,995
Pinyon-Juniper	-	50	2,260				
Saltbush	-	-	285				
Mountain Shrub	80	630	265				
Sagebrush	25	-	-				
Grass	85	-	-				
Greasewood	50	245	20				
5532 Burro Ridge				-	200	-	200
Pinyon-Juniper	-	85	35				
Mountain Shrub	-	45	-				
Sagebrush	-	25	10				
5533 Onion Lakes				-	630	-	630
Mountain Shrub	-	-	200				
Conifer	-	430	-				
5534 Shin Park				-	-	3,970	3,970
Pinyon-Juniper	-	470	-				
Saltbush	-	50	3,450				
5535 Cedar Creek				-	240	-	240
Pinyon-Juniper	-	150	20				
Saltbush	-	-	70				
5536 South Canal				-	-	2,115	2,115
Saltbush	-	-	2,115				
5538 Rock Ditch				-	55	-	55
Saltbush	55	-	-				
5540 Dry Gulch				-	4,860	-	4,860
Pinyon-Juniper	-	225	2,575				
Mountain Shrub	-	130	50				
Sagebrush	-	1,545	225				
Broadleaf Trees	-	110	-				
5542 Bosgal				-	50	-	50
Saltbush	50	-	-				
5543 Waugh				-	200	-	200
Pinyon-Juniper	-	-	15				
Saltbush	165	20	-				
5544 Kelly				-	80	-	80
Saltbush	80	-	-				
5545 Henshaw				-	170	-	170
Pinyon-Juniper	-	35	-				
Sagebrush	-	135	-				
5546 Waterdog Basin				-	400	-	400
Pinyon-Juniper	-	-	335				
Sagebrush	-	-	65				
5547 Slagle Pass				-	310	-	310
Conifer	-	310	-				
5548 Washboard Rock				-	760	-	760
Mountain Shrub	-	40	-				
Conifer	-	655	-				
Broadleaf Trees	-	10	-				
Grass	-	55	-				
5549 High Park				1,660	-	-	1,660
Sagebrush	-	40	-				
Conifer	700	650	-				
Barren	-	130	-				
Grass	140	-	-				
5551 Dexter Creek				-	65	-	65
Mountain Shrub	-	-	65				
5552 Dallas				-	-	240	240
Pinyon-Juniper	-	145	35				
Sagebrush	-	15	45				
5553 Fisher Creek				-	-	480	480
Pinyon-Juniper	-	160	-				
Mountain Shrub	-	320	-				
5555 Taylor Draw				-	-	325	325
Pinyon-Juniper	-	-	325				
5556 Burro Creek				-	-	120	120
Pinyon-Juniper	-	-	120				
5557 Alkali				-	-	485	485
Pinyon-Juniper	-	165	275				
Sagebrush	-	20	25				
5559 South Fork				-	120	-	120
Pinyon-Juniper	-	-	30				
Sagebrush	-	-	90				
5560 Cookie Tree				-	-	640	640
Pinyon-Juniper	-	220	-				
Sagebrush	-	-	420				

TABLE 2-10
RANGE CONDITION AND RANGE TREND BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Range Condition			Range Trend			Total Acres
	Good	Fair	Poor	Up	Static	Down	
5561 East Fork				-	-	80	80
Pinyon-Juniper	-	-	45				
Mountain Shrub	-	-	35				
5562 Hillside				-	-	160	160
Pinyon-Juniper	-	105	-				
Mountain Shrub	-	15	-				
Sagebrush	-	-	40				
5563 Moonshine Park				-	230	-	230
Mountain Shrub	-	-	150				
Conifer	-	-	45				
Broadleaf Trees	-	-	30				
Grass	-	-	5				
5564 Gravel Pit				-	-	40	40
Pinyon-Juniper	-	-	40				
5565 Tommy Creek				-	-	120	120
Pinyon-Juniper	30	-	45				
Desert Shrub	10	-	-				
Mountain Shrub	30	5	-				
5566 Cow Creek				-	520	-	520
Mountain Shrub	-	-	355				
Conifer	-	-	105				
Broadleaf Trees	-	-	60				
5567 Busted Boiler				-	40	-	40
Pinyon-Juniper	40	-	-				
5568 Baldy				-	-	680	680
Mountain Shrub	-	-	255				
Conifer	-	-	195				
Grass	-	-	230				
5569 Hairpin				-	500	-	500
Sagebrush	500	-	-				
5570 Cedar				-	2,125	-	2,125
Pinyon-Juniper	-	-	1,140				
Mountain Shrub	230	-	150				
Sagebrush	130	-	475				
5572 McKenzie Creek				-	110	-	110
Pinyon-Juniper	90	-	20				
5574 Tappan Creek				-	-	240	240
Pinyon-Juniper	-	75	-				
Sagebrush	-	165	-				
Unallotted Parcels				-	13,550	-	13,550
Pinyon-Juniper	-	4,355	1,235				
Saltbush	-	40	1,390				
Desert Shrub	-	-	350				
Mountain Shrub	640	1,070	-				
Sagebrush	560	1,120	2,480				
Conifer	100	130	-				
Broadleaf Trees	80	-	-				
SUBTOTALS							SUBTOTALS
Pinyon-Juniper	36,300	138,685	95,535				270,520
Saltbush	4,500	13,885	58,115				76,500
Desert Shrub	10	9,895	48,360				58,265
Mountain Shrub	20,065	25,995	7,165				53,225
Sagebrush	9,670	20,045	19,210				48,925
Conifer	2,195	3,450	420				6,065
Barren	0	130	4,175				4,305
Waste	0	1,130	1,070				2,200
Broadleaf Trees	450	610	1,050				2,110
Halfshrub	685	1,150	0				1,835
Grass	785	210	235				1,230
Greasewood	50	245	20				315
Annuals	280	0	0				280
TOTALS	74,990	215,430	235,355	76,310	277,720	171,745	525,775



Map 2-7. Range Conditions

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)			
4001 Dominguez	5,600	41,020		Hija	Atca		
Pinyon-Juniper			55	1	2		
Saltbush			12	2	5		
Desert Shrub			12	2	5		
Sagebrush			51	1	2		
4002 Lower Escalante	335	1,665		Orhy	Atca		
Pinyon-Juniper			50	10	10		
Saltbush			36	5	10		
Desert Shrub			15	T	-		
Sagebrush			24	T	-		
4005 Fall Cabin	40	300		Sihy	Epvi		
Pinyon-Juniper			34	6	3		
4006 Dry Mesa	1,185	14,160		Orhy	Atca	Artemisia	
Pinyon-Juniper			70	5	-	30	
Saltbush			50	10	20	20	
Sagebrush			50	5	T	40	
4007 Sawmill Mesa	790	9,170		Hija	Kocr	Atca	Arno
Pinyon-Juniper			45	22	3	3	7
Saltbush			19	84	-	11	-
Sagebrush			24	42	-	-	17
4008 25 Mesa	810	6,630		Hija	Atca	Spcr	
Pinyon-Juniper			32	21	4	-	
Saltbush			36	25	10	-	
Broadleaf Trees			67	-	3	33	
4010 Monitor Mesa	1,435	8,760		Hija	Kocr	Arno	Atca
Pinyon-Juniper			32	5	3	10	1
Sagebrush			50	7	2	8	1
Broadleaf Trees			67	Spcr 33	-	-	3
4011 Lower Roubideau	45	400		Spcr	Atca		
Broadleaf Trees			67	33	3		
4012 Canal	1,000	8,875		Orhy	Kocr	Atca	
Pinyon-Juniper			25	2	1	2	
Saltbush			20	1	-	1	
4013 Ben Lowe	570	4,570		Orhy	Hija	Atca	Cemo
Pinyon-Juniper			53	1	4	-	1
Saltbush			43	3	10	3	-
Sagebrush			36	2	10	-	-
4014 Joker	115	1,050		Agropyron		Amal	
Pinyon-Juniper			35	70	3		
4015 White Ranch	25	265		Hija	Atca	Cemo	
Pinyon-Juniper			30	20	4	3	
4016 Wells Gulch	2,680	7,160		Hija	Orhy	Atco	Atca
Pinyon-Juniper			58	26	T	2	-
Desert Shrub			16	20	5	2	1

Note: Present production, vegetative density, and species composition are based on Bureau of Land Management, Uncompahgre Basin Resource Area, unit resource analyses and allotment management plans. For a discussion of methodology and data base for current production levels and potential production, refer to appendix 4. Potential production is based on Soil Conservation Service, Paonia Soil Survey Report and Ridgway Soil Survey Report. See table 2-10 for vegetative types, condition, and trend by allotment.

a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.

b/ Vegetative density as defined in the glossary is presented as a representative number for the whole type.

c/ "T" = trace. "-" = not a key species in that type in that allotment. "0" = no trace of this key species present now in that type in the future.

See list at end of table for scientific and common names of key species listed here by scientific abbreviations.

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)			
4017 Alkali Flats	3,560	12,220		Hija	Orhy	Atco	Atca
Pinyon-Juniper			36	-	6	9	5
Saltbush			19	-	-	-	21
Desert Shrub			25	20	T	25	5
Mountain Shrub			50	-	2	-	2
Sagebrush			24	42	T	-	-
4021 Point Creek	115	390		Hija	Orhy	Atco	Atca
Desert Shrub			20	5	2	1	1
4022 Petrie Mesa	1,430	4,415		Hija	Orhy	Atri-plex	Eula
Pinyon-Juniper			31	3	1	11	-
Saltbush			24	7	1	30	5
Desert Shrub			13	Spcr 1	-	2	-
4024 Dirty George	300	2,470		Hija	Stvi	Cemo	Amal
Pinyon-Juniper			49	10	-	1	2
Mountain Shrub			65	-	1	8	6
4025 Ward Creek-Doughspoon	700	6,505		Hija	Atca	Atco	
Pinyon-Juniper			39	10	3	3	
Saltbush			36	5	10	10	
Desert Shrub			24	1	10	7	
4026 Escalante Canyon	40	1,040		Hija	Artr		
Pinyon-Juniper			40	15	5		
Saltbush			30	15	5		
4501 Milk Creek	15	115		Kocr	Orhy	Artr	
Mountain Shrub			75	11	9	60	
4502 Surface to Leroux	495	2,630		Popr	Agsm	Cemo	
Pinyon-Juniper			36	2	1	8	
Mountain Shrub			75	4	4	3	
4503 Stingley Gulch	125	1,070		Orhy	Pose	Pera	Cemo
Pinyon-Juniper			40	1	0	-	2
Mountain Shrub			55	4	8	3	7
4504 Leroux Creek	195	2,380		Stco	Orhy	Cemo	Artr
Pinyon-Juniper			37	-	T	5	35
Mountain Shrub			63	2	2	3	16
4505 Juniper Knob	10	75		Orhy	Atca		
Pinyon-Juniper			35	3	3		
4506 Oak Mesa	95	1,190		Orhy	Basa	Cemo	
Pinyon-Juniper			35	3	3	3	
Mountain Shrub			72	7	7	1	
4507 Jay Creek	1,030	7,295		Orhy	Cemo		
Pinyon-Juniper			49	T	10		
Mountain Shrub			72	1	14		
4509 Upper Jay Creek	75	480		Agtr	Atca		
Pinyon-Juniper			28	5	3		
Mountain Shrub			60	10	10		
4511 Overland	20	180		Orhy	Amal		
Mountain Shrub			51	2	65		
4512 East Roatcap	10	40		Agtr	Amal		
Mountain Shrub			51	2	65		
4513 Stevens Gulch	865	4,325		Orhy	Sihy	Cemo	
Pinyon-Juniper			49	-	4	10	
Mountain Shrub			72	1	4	3	
Sagebrush			44	2	2	2	
4514 Upper Terror Creek	5	35		Orhy	Sihy	Amal	
Mountain Shrub			76	2	4	4	
4515 Freeman Gulch	70	615		Agsm	Cemo		
Pinyon-Juniper			52	4	6		
Mountain Shrub			76	4	6		

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)			
4516 North Fork	2,630	10,775		Hija	Atca	Orhy	Cemo
Pinyon-Juniper			56	10	6	T	3
					Atco		
Saltbush			15	15	24	-	-
Desert Shrub			14	8	22	-	-
				Brin	Amal		
Mountain Shrub			83	3	2	-	-
				Hija	Arno		
Sagebrush			38	34	13	-	-
					Atco		
Annuals			24	33	21	-	-
4517 Coal Gulch	770	6,890		Orhy	Stco	Cemo	
Pinyon-Juniper			45	8	2	10	
Mountain Shrub			82	8	2	5	
4518 Pilot Creek	40	60		Agsm	Amal		
Mountain Shrub			90	10	T		
4519 Muddy Creek	25	530		Brin	Putr		
Mountain Shrub			85	10	2		
Sagebrush			55	10	2		
4520 Spring Creek	30	135		Brin	Putr		
Mountain Shrub			85	10	2		
4521 Stock Driveway	10	135		Brin	Amal		
Mountain Shrub			82	4	5		
4522 Downing	30	135		Brin	Amal		
Mountain Shrub			82	4	5		
4523 Williams Creek	10	120		Feid	Cemo		
Mountain Shrub			75	5	5		
4524 Deep Creek	10	180		Feid	Artr		
Mountain Shrub			80	5	10		
Conifer			90	2	1		
4525 Anthracite Creek	170	1,215		Agtr	Stco	Cemo	Artr
Mountain Shrub			62	2	3	5	16
Conifer			76	4	-	T	5
Broadleaf Trees			76	4	-	T	5
4526 Crystal Creek	60	425		Orhy	Amal		
Mountain Shrub			80	5	5		
Conifer			75	T	2		
4527 Jumbo Mountain	700	4,330		Stco	Orhy	Cemo	Artr
Pinyon-Juniper			46	-	T	11	7
						Atca	
Saltbush			33	-	T	6	-
						Cemo	
Mountain Shrub			71	1	1	1	14
Sagebrush			44	2	2	2	57
						Syor	
Conifer			90	6	-	6	-
Broadleaf Trees			90	6	-	6	-
4528 Oak Ridge	335	3,095		Orhy	Agtr	Artr	
Pinyon-Juniper			47	T	1	28	
						Amal	
Mountain Shrub			70	3	3	35	
						Artr	
Sagebrush			40	0	0	85	
4529 Reynolds Creek	190	1,335		Orhy	Agtr	Artr	
Pinyon-Juniper			47	T	1	28	
						Amal	
Mountain Shrub			82	1	T	18	
						Artr	
Sagebrush			36	0	0	100	

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)
4530 McDonald Mesa	205	2,105		Agsm Atca Atco
Pinyon-Juniper			45	3 5 -
Saltbush			20	5 10 10
Sagebrush			25	5 5 15
4531 Popp Ranch	15	260		Orhy Artr
Pinyon-Juniper			47	T 28
Sagebrush			36	- 100
4532 McDonald Ranch	725	3,060		Agsm Hija Atco Atca
Pinyon-Juniper			20	T 5 5 5
Saltbush			17	5 5 15 5
Sagebrush			28	5 5 5 10
4535 Home Place	15	100		Sihy Atco
Saltbush			28	5 64
4536 West Young's Peak	10	100		Agsm Atco Cemo
Pinyon-Juniper			73	1 - 4
Saltbush			28	- 64 -
4537 Young's Peak	240	1,500		Agsm Cemo
Pinyon-Juniper			73	1 4
4538 Missouri Flats	5	135		Popr Amal
Mountain Shrub			82	1 18
4539 Cottonwood Creek	10	135		Popr Amal
Mountain Shrub			82	1 18
4540 North Saddle Peak	40	265		Popr Amal
Mountain Shrub			82	1 18
4541 Sunshine Mesa	5	25		Sihy Amal
Pinyon-Juniper			24	20 41
4543 South Saddle Peak	20	255		Orhy Cemo
Pinyon-Juniper			46	T 15
4548 Creek Bottom	10	175		Agtr Artr
Conifer			76	4 5
Broadleaf Trees			76	4 5
4549 Dry Creek	265	3,380		Orhy Cemo
Pinyon-Juniper			42	2 2
Mountain Shrub			55	1 4
5002 Dedication Site	100	1,575		Hija Atca
Pinyon-Juniper			31	10 19
5003 Selig Canal	725	2,565		Stco Atriplex
Pinyon-Juniper			30	27 3
Saltbush			12	Orhy T 30
Mountain Shrub			56	Feid Artr 18 23
5008 Brush Point	1,755	4,625		Hija Atco
Pinyon-Juniper			30	10 15
Saltbush			20	15 25
Barren			0	- -
5010 Dead Horse	200	850		Brin Cemo
Mountain Shrub			83	3 T
Sagebrush			75	T T
5011 Gould Reservoir	390	2,510		Orhy Amal
Mountain Shrub			68	T 14
Sagebrush			41	T 7
5012 Cedar Point	80	405		Orhy Amal
Pinyon-Juniper			55	1 15
Mountain Shrub			70	T 10
Sagebrush			80	1 10

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)			
5013 Iron Canyon	135	1,115		Orhy	Arno		
Pinyon-Juniper			48	T	23		
					Amal		
Mountain Shrub			68	T	14		
Sagebrush			41	T	7		
5014 Poison Spring	145	1,155		Orhy	Arno		
Pinyon-Juniper			48	T	6		
Mountain Shrub			65	T	14		
Sagebrush			63	T	14		
5015 Grizzly Gulch	260	1,715		Orhy	Amal		
Mountain Shrub			65	T	20		
Sagebrush			41	T	5		
5016 Black Canyon	45	390		Kocr	Amal		
Mountain Shrub			80	10	19		
Sagebrush			40	5	10		
5017 Green Mountain	2,825	10,560		Kocr	Orhy	Amal	Atca
Pinyon-Juniper			40	-	T	-	1
Mountain Shrub			55	24	-	20	-
Sagebrush			42	20	5	5	-
5020 Black Ridge	605	4,155		Orhy	Artr	Atca	
Pinyon-Juniper			44	2	-	T	
Sagebrush			28	T	40	-	
5022 Rabbit Gulch	70	300		Orhy	Arno	Atca	
Pinyon-Juniper			45	4	-	T	
Sagebrush			38	T	13	-	
5025 Fruitland Mesa	5	50		Hija	Artr		
Pinyon-Juniper			50	5	20		
5026 Star Nelson Airport	5	15		Sihy	Atco		
Saltbush			15	2	5		
5027 Adobe	30	335		Orhy	Pera		
Pinyon-Juniper			63	5	38		
Sagebrush			55	5	10		
5028 Doug Creek	70	445		Orhy	Pera		
Pinyon-Juniper			63	5	38		
5029 Spring Gulch	150	480		Brin	Cemo		
Mountain Shrub			83	5	T		
Sagebrush			75	T	T		
Conifer			85	-	-		
Broadleaf Trees			76	-	-		
5030 Bostwick Park	380	750		Orhy	Atco	Artr	
Pinyon-Juniper			40	3	-	3	
Saltbush			30	-	20	-	
Mountain Shrub			60	5	-	5	
5033 Pinyon Springs	160	860		Agsm	Amal		
Pinyon-Juniper			45	4	4		
Mountain Shrub			63	T	29		
5036 Big Gulch	5	25		Spcr	Atco		
Desert Shrub			11	2	18		
5037 Black Mesa	0*	0		Spcr	Atco		
Mountain Shrub			-	-	-		
Conifer			-	-	-		
5038 Red Canyon	5	55		Hija	Artr		
Pinyon-Juniper			50	5	20		
5039 Onion Valley	20	35		Stvi	Amal		
Mountain Shrub			55	20	25		

* This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)	
5040 Pine Ridge	15	70		Stvi	Amal
Mountain Shrub			50	15	25
Broadleaf Trees			80	15	-
5041 East Gould Reservoir	40	530		Agsm	Artr
Sagebrush			39	3	74
5043 Collins	15	305		Orhy	Cemo
Pinyon-Juniper			55	T	15
5044 Big Pasture	20	220		Orhy	Cemo
Pinyon-Juniper			55	T	15
Sagebrush			45	T	Artr 40
5045 Black Bullet	5	55		Hija	Artr
Pinyon-Juniper			55	5	20
5046 Big Gulch	35	190		Agsm	Atca
Pinyon-Juniper			45	5	10
Desert Shrub			11	5	10
5047 Mesa Creek	75	115		Stvi	Amal
Mountain Shrub			75	10	15
Conifer			80	10	10
5048 Morrow Point	40	60		Stvi	Amal
Mountain Shrub			75	10	15
Conifer			80	10	10
5049 Smith Fork	30	255		Orhy	Artr
Pinyon-Juniper			45	4	13
5050 Allen Reservoir	30	220		Orhy	Pera
Pinyon-Juniper			63	5	38
Sagebrush			55	T	10
5502 Sandy Wash	940	6,275		Hija	Atca
Pinyon-Juniper			51	12	5
Waste			43	31	2
5503 Green	50	375		Orhy	Atca
Pinyon-Juniper			25	4	1
5504 Roatcap	350	2,560		Hija	Atca
Pinyon-Juniper			25	20	1
Sagebrush			30	10	1
Grass			60	Orhy 15	5
5505 Transfer	300	2,475		Orhy	Cemo
Pinyon-Juniper			51	10	1
Waste			43	T	Arno 9
5507 Pipeline	2,270	15,990		Orhy	Cemo
Pinyon-Juniper			44	5	2
Halfshrub			59	Hija 37	Artr 2
5508 Government Springs	180	1,885		Orhy	Cemo
Pinyon-Juniper			40	15	1
5509 Coal Creek	50	265		Hija	Bogr
Halfshrub			59	37	31
5510 Bald Hills	25	170		Kocr	Amal
Mountain Shrub			80	5	15
Sagebrush			65	5	5
5511 Shavano Mesa	200	1,630		Hija	Atca
Pinyon-Juniper			35	15	T
Sagebrush			45	15	T
Halfshrub			65	10	T

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)			
5512 Franklin Mesa	355	3,000		Hija	Artr		
Pinyon-Juniper			35	15	10		
Sagebrush			40	10	25		
Grass			40	10	25		
5513 Dry Creek Basin	410	4,520		Orhy	Artr		
Pinyon-Juniper			57	9	28		
Sagebrush			45	T	30		
5514 East Fork Dry Creek	15	115		Orhy	Amal		
Pinyon-Juniper			60	10	5		
Mountain Shrub			90	15	20		
Sagebrush			60	15	Artr 20		
Broadleaf Trees			75	-	-		
5515 Olathe Reservoir	15	155		Orhy	Cemo		
Pinyon-Juniper			57	7	9		
Mountain Shrub			90	15	15		
5516 Piney	800	6,945		Orhy	Amal		
Mountain Shrub			40	10	20		
Sagebrush			35	5	Artr 35		
5517 Spring Creek Canyon	35	370		Orhy	Artr		
Pinyon-Juniper			35	T	3		
5518 Dave Wood	215	2,140		Orhy	Cemo		
Pinyon-Juniper			55	T	10		
Sagebrush			50	T	Artr 35		
5520 Lower Horsefly	965	5,710		Orhy	Atco	Cemo	
Pinyon-Juniper			63	6	-	13	
Saltbush			42	2	43	-	
Sagebrush			53	4	28	-	
5521 Highway 90	445	5,185		Orhy	Atca		
Pinyon-Juniper			50	2	2		
5522 Beaver Hill	1,570	16,485		Orhy	Atca		
Pinyon-Juniper			50	5	5		
5523 Horsefly	55	470		Kocr	Cemo		
Pinyon-Juniper			36	7	3		
5524 Duckett Draw	15	230		Hija	Sihy	Atca	Artr
Pinyon-Juniper			45	-	16	-	27
Sagebrush			24	29	-	T	-
5525 Dry Creek	15	85		Spcr	Artr		
Pinyon-Juniper			35	10	10		
Grass			20	20	-		
5529 Log Hill	310	3,395		Orhy	Amal		
Pinyon-Juniper			75	5	5		
Mountain Shrub			70	10	15		
5530 Billy Creek	265	1,480		Hija	Orhy	Cemo	Atco
Pinyon-Juniper			46	5	T	T	-
Saltbush			42	-	5	-	33
Mountain Shrub			63	-	T	2	-
Sagebrush			45	5	5	-	10
Grass			60	5	10	2	2
5532 Burro Ridge	20	165		Orhy	Artr		
Pinyon-Juniper			45	T	10		
Mountain Shrub			63	T	10		
Sagebrush			45	5	30		

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)	
5533 Onion Lakes	35	410		Brin	Cemo
Mountain Shrub			63	3	2
Conifer			61	3	-
5534 Shin Park	300	510		Orhy	Atco
Pinyon-Juniper			52	10	5
Saltbush			30	3	13
5535 Cedar Creek	10	30		Orhy	Amal
Pinyon-Juniper			45	10	5
					Atco
Saltbush			30	3	15
5536 South Canal	120	275		Orhy	Atco
Saltbush			30	3	13
5538 Rock Ditch	5	5		Orhy	Atco
Saltbush			30	3	13
5540 Dry Gulch	930	4,050		Agsm	Atca
Pinyon-Juniper			26	13	T
Mountain Shrub			60	15	T
Sagebrush			25	26	1
Broadleaf Trees			65	20	1
5542 Bosgal	5	5		Orhy	Atco
Saltbush			20	10	30
5543 Waugh	10	25		Agsm	Atco
Pinyon-Juniper			35	10	5
Saltbush			20	5	70
5544 Kelly	5	10		Agsm	Atco
Saltbush			45	8	50
5545 Henshaw	15	20		Sihy	Artr
Pinyon-Juniper			50	10	10
Sagebrush			48	10	30
5546 Waterdog Basin	45	290		Orhy	Amal
Pinyon-Juniper			63	5	2
					Artr
Sagebrush			45	10	25
5547 Slagle Pass	40	260		Brin	Viam
Conifer			61	5	11
5548 Washboard Rock	55	260		Orhy	Amal
Mountain Shrub			55	10	15
				Brin	Viam
Conifer			61	5	11
				Feth	
Grass			85	45	-
				Brin	Agro-pyron
Broadleaf Trees			99	10	5
5549 High Park	110	650		Stco	Artr
Sagebrush			65	5	14
Barren			0	-	-
				Brin	Viam
Conifer			61	5	11
				Feth	
Grass			87	24	-
5551 Dexter Creek	5	55		Orhy	Amal
Mountain Shrub			50	5	10
5552 Dallas	15	200		Orhy	Cemo
Pinyon-Juniper			45	2	24
					Artr
Sagebrush			40	1	22

TABLE 2-11
PRESENT AND POTENTIAL VEGETATIVE PRODUCTION, PRESENT VEGETATIVE DENSITY, AND KEY SPECIES COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition a/ (%)			
5553 Fisher Creek	40	400		Agsm	Cemo		
Pinyon-Juniper			45	T	20		
					Arno		
Mountain Shrub			59	5	20		
5555 Taylor Draw	25	270		Sihy	Amal		
Pinyon-Juniper			64	3	3		
5556 Burro Creek	10	100		Orhy	Amal		
Pinyon-Juniper			60	5	3		
5557 Alkali	40	405		Orhy	Cemo		
Pinyon-Juniper			55	5	10		
Sagebrush			50	5	T		
5559 South Fork	15	100		Orhy	Cemo		
Pinyon-Juniper			45	2	24		
Sagebrush			45	5	10		
5560 Cookie Tree	50	535		Orhy	Cemo		
Pinyon-Juniper			45	2	20		
Sagebrush			45	2	5		
5561 East Fork	5	65		Orhy	Cemo		
Pinyon-Juniper			38	13	3		
Mountain Shrub			45	5	3		
5562 Hillside	10	135		Stco	Amal		
Pinyon-Juniper			52	T	5		
Mountain Shrub			60	1	10		
Sagebrush			45	2	2		
5563 Moonshine Park	10	175		Brin	Amal		
Mountain Shrub			53	10	20		
Conifer			65	5	5		
Grass			73	35	-		
Broadleaf Trees			97	18	5		
5564 Gravel Pit	5	35		Orhy	Cemo		
Pinyon-Juniper			43	T	5		
5565 Tommy Creek	20	100		Sihy	Amal		
Pinyon-Juniper			64	3	3		
					Atco		
Desert Shrub			45	10	20		
					Amal		
Mountain Shrub			71	8	10		
5566 Cow Creek	105	435		Orhy	Amal		
Mountain Shrub			73	1	11		
Conifer			70	1	3		
Broadleaf Trees			80	T	2		
5567 Busted Boiler	5	35		Orhy	Cemo		
Pinyon-Juniper			75	10	5		
5568 Baldy	135	565		Stco	Amal		
Mountain Shrub			52	T	5		
				Brin			
Conifer			60	5	2		
Grass			55	20	-		
5569 Hairpin	30	65		Orhy	Cemo		
Sagebrush			54	4	4		
5570 Cedar	375	1,770		Sihy	Stco	Agsm	Amal
Pinyon-Juniper			24	13	-	T	4
Mountain Shrub			33	2	T	2	2
Sagebrush			44	-	7	2	4
5572 McKenzie Creek	10	20		Orhy	Cemo		
Pinyon-Juniper			61	8	3		
5574 Tappan Creek	20	200		Sihy	Artr		
Pinyon-Juniper			31	3	68		
TOTAL	51,315	323,880					

LIST OF KEY VEGETATIVE SPECIES AND SCIENTIFIC ABBREVIATIONS

Species Abbreviation	Species Name	Common Name
GRASSES		
Agin	*Agropyron intermedium*	Intermediate wheatgrass
Agcr	*Agropyron cristatum*	Crested wheatgrass
Agsm	*Agropyron smithii*	Western wheatgrass
Agtr	*Agropyron trachycaulum*	Slender wheatgrass
Bogr	*Bouteloua gracilis*	Blue grama
Brin	*Bromus inermis*	Smooth brome
Feid	*Festuca idahoensis*	Idaho fescue
Feth	*Festuca thurberi*	Thurber fescue
Hija	*Hilaria jamesii*	Galleta grass
Kocr	*Koeleria cristata*	Junegrass
Orhy	*Oryzopsis hymenoides*	Indian ricegrass
Popr	*Poa pratensis*	Kentucky bluegrass
Pose	*Poa secunda*	Sandberg bluegrass
Sihy	*Sitanion hystrix*	Bottlebrush squirreltail
Spcr	*Sporobolus cryptandrus*	Sand dropseed
Stco	*Stipa comata*	Needle-and-thread
Stvi	*Stipa viridula*	Green needlegrass
FORBS		
Basa	*Balsamorhiza sagittata*	Arrowleaf balsamroot
Viam	*Vicia americana*	American vetch
SHRUBS		
Amal	*Amelanchier alnifolia*	Common serviceberry
Arno	*Artemisia nova*	Black sagebrush
Artr	*Artemisia tridentata*	Big sagebrush
Atca	*Atriplex canescens*	Fourwing saltbush
Atco	*Atriplex confertifolia*	Shadscale
Atcr	*Atriplex corrugata*	Mat saltbush
Atnu	*Atriplex nuttalli*	Nuttall saltbush
Cemo	*Cercocarpus montanus*	Mountain mahogany
Epvi	*Ephedra viridis*	Mormon tea
Pera	*Peraphyllum ramosissimum*	Squaw apple
Putr	*Purshia tridentata*	Bitterbrush
Syor	*Symphoricarpos oreophilus*	Mountain snowberry

Chemical control of halogeton was undertaken in the summer of 1963 in an area 8 miles east of Delta. No follow-up was ever done on this project. Since no sheep losses that can be attributed to this plant have ever been reported in this area, halogeton may not present a serious problem.

Endangered Plants

Three plants which are proposed endangered on the Federal Register list of endangered plants (FR Vol. 41, No. 117, June 16, 1976) are present in the ES area. These are *Echinocereus triglochidiatus* var. *inermis*, *Penstemon retrorsus*, and *Sclerocactus glaucus*. Two more plants on the Federal Register list, *Eriogonum pelinophilum* and *Arabis gunnisoniana*, have been reported to be in the ES area but have yet to be found on BLM-administered land. One plant which is not on the Federal Register but is very rare in Colorado, *Mimulus eastwoodiae*, is present in the ES area.

The allotments on which these plants have been found along with their associated vegetative and soil types, are listed in table 2-12 (with the exception of *Eriogonum pelinophilum* and *Arabis gunnisoniana*, which have not been found in the ES area). Specimens of *Penstemon retrorsus* are shown in figures 2-1 and 2-2.

Wildlife

Terrestrial

Each of the thirteen habitat types (vegetative types) found within the ES area consists of a variety of plant species which provide food and cover for numerous species of wildlife. Habitat types are used in this section to help describe the wildlife populations and their relation to livestock grazing.

Habitat condition varies greatly for the different species of wildlife; for each species with regard to age and sex; and according to the different seasons of the year (King 1938). Because of this very complex interrelationship, the habitat has been evaluated with regard to browse condition. Transects were run to establish the number of satisfactory and unsatisfactory plants (as defined in BLM Manual 6634.3) along the transect route. The results of these transects are shown in tables 2-13, 2-14, and 2-15, and summarized in table 2-16. Further methodology is located in appendix 5. The original transect work sheets are available for inspection upon request at the Montrose District Office.

Considerable information is available on the habitat requirements of the game animals—specially the large herbivorous species such as deer, elk, and antelope—and of those species considered endangered. Those game species on which grazing is considered to have a significant impact are discussed in the following narrative. Little detailed information is available on the remaining animals; therefore, they will be summarized according to the major taxonomic groups. (A list of the species of terrestrial animals present in the ES area is available from the Montrose District Office.)

Three introduced game bird species reside within the Es area: the chukar, the Gambel's quail, and the ring-necked pheasant. (Pheasants rarely inhabit BLM-administered land; they are mentioned only because they are an introduced species.) Several indigenous species have been reestablished in the ES area: the pronghorn antelope, the wild turkey, and the river otter. The river otter, a Colorado Division of Wildlife (DOW) endangered species, has recently been introduced into the Gunnison River. (See endangered species section.) Attempts to establish Hungarian partridge, bobwhite quail, and California mountain quail in the ES area have been unsuccessful.

BIG GAME

Mule deer, elk, pronghorn antelope, mountain lion, and black bear are the big game species in the ES area.

Mule Deer

Population estimates based on a six year average harvest (1970-1975) for each of the DOW game management units (GMUs) in the ES area are presented in table 2-17. The winter deer population using NRL in the ES area is presently estimated to be about 15,000.

In total the deer population in the ES area is increasing. The wildlife conservation officers (WCOs) of the area, in making their season recommendations for 1976, indicated that eight GMUs out of nine have an increasing population and an increasing trend. However, mule deer population dynamics in the area are difficult to ascertain. In the North Fork Valley they have increased to the point that additional removal of deer through sport hunting is necessary; in the north end of the Uncompahgre Plateau the numbers are down, and sport harvest has been curtailed.

TABLE 2-12
ENDANGERED PLANTS IN THE ES AREA

Genus/Species	Allotment(s)	Vegetative Type	Soil Type(s)
Echinocereus triglochidiatus var. inermis	4006 Dry Mesa 4010 Monitor Mesa	Sagebrush	Kech Progresso
Penstemon retrorsus	5003 Selig Canal 5008 Brush Point 5030 Bostwick Park 5520 Lower Horsefly 5534 Shin Park 5536 South Canal 5540 Dry Gulch	Saltbush	Chipeta-Persayo-Badlands
Sclerocactus glaucus	4022 Petrie Mesa	Saltbush	Ustollic-Haplargids-Rock Outcrop and Chipeta-Persayo-Badlands
Mimulus eastwoodiae	4001 Dominguez	Hanging Garden Vegetation	Unknown

Figure 2-1. Live specimen of Penstemon retrorsus (October 1976) found east of Montrose, Colorado on Mancos shale.

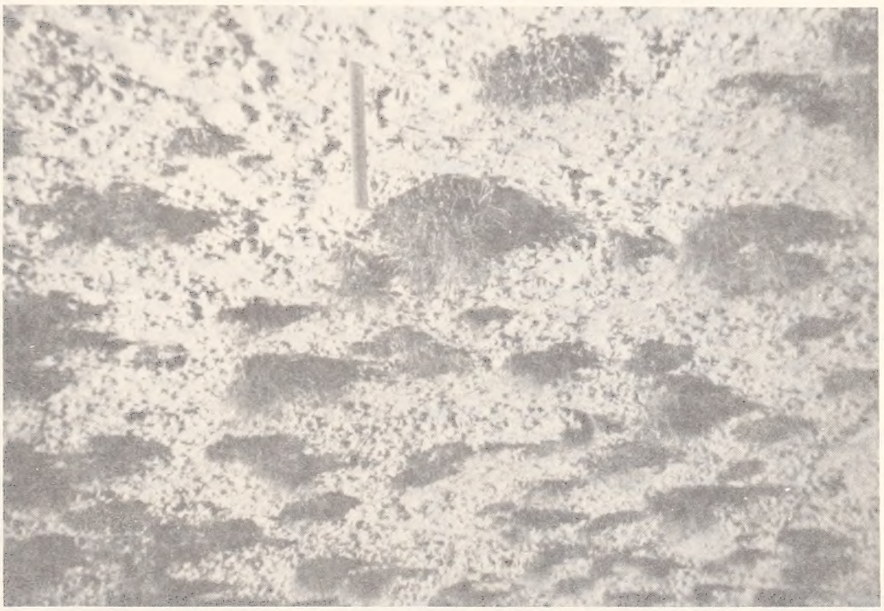


Figure 2-2. Penstemon retrorsus is abundant in localized areas. The ruler in the picture is 30 centimeters tall.

TABLE 2-13
DEER CRUCIAL AREAS AND THEIR PRESENT BROWSE CONDITION

Crucial Area	Allotment Name & No.	Game Management Unit	Acres			
			Good	Fair	Poor	Total
Deer Basin	4017 Alkali Flats, Pipeline Pasture	411, A-82	-	80	240	320
	4516 North Fork, Deer Basin Pasture	411, A-82	-	240	720	960
Negro Mesa	4017 Alkali Flats, Pipeline Pasture	411, A-82	-	120	120	240
	4025 Ward Creek-Doughspoon, Pasture 4	411, A-82	-	-	240	240
Oak Creek	4024 Dirty George, South Branch Pasture	411, A-82	-	800	-	800
	4025 Ward Creek-Doughspoon, Pasture 1	411, A-82	-	-	840	840
Camp Ridge	4001 Dominguez	62	-	4,390	10,970	15,360
Dry Mesa	4006 Dry Mesa:	62				
	Subunit B		-	2,415	6,065	8,480
Cottonwood Mesa	4005 Fall Cabin	62	-	100	260	360
	4007 Sawmill Mesa	62	-	525	1,315	1,840
	4008 25 Mesa	62	-	170	430	600
Monitor Mesa	4010 Monitor Mesa	62	-	935	2,345	3,280
	4014 Joker	62	-	160	400	560
Winter Mesa	4010 Monitor Mesa	62	-	1,275	3,205	4,480
Camel Back	4012 Canal, Pasture 4	62	-	240	600	840
Pea Green	4012 Canal, Pastures 3 & 4	62	-	355	885	1,240
	4013 Ben Lowe, Ben Lowe & Cedar Pastures	62	-	605	1,515	2,120
Leroux Creek	4503 Stingley Gulch	52	-	540	540	1,080
	4549 Dry Creek	521	-	300	900	1,200
Horse Park	4504 Leroux Creek	52	-	395	1,200	1,595
	4506 Oak Mesa:	52				
	Subunit G		-	80	240	320
	Subunit H		-	190	560	750
Oak Mesa	4507 Jay Creek	52, 521	-	585	1,755	2,340
	4509 Upper Jay Creek	52, 521	-	60	180	240
Wakefield Mesa	4507 Jay Creek	52, 521	-	400	1,200	1,600
	4511 Overland	521	-	-	160	160
	4512 East Roatcap:	521	-	-	30	30
	Subunit I Roatcap		-	230	690	920
Fry Mesa	4513 Stevens Gulch:	521				
	Subunit I Roatcap		-	80	240	320
	Subunit J Terror Creek		-	190	570	760
Terror Creek	4513 Stevens Gulch:	521				
	Subunit J Terror Creek		-	430	1,290	1,720
	4515 Freeman Gulch	521	-	-	320	320
Paonia Reservoir	4525 Anthracite Creek	521	-	170	510	680
Minnesota Creek	4527 Jumbo Mountain	53	-	540	1,620	2,160
	4528 Oak Ridge	53	-	130	390	520
Reynolds Creek	4529 Reynolds Creek	53	-	270	810	1,080
	4530 McDonald Mesa	53	-	510	1,530	2,040
	4537 Young's Peak:	53				
	Subunit Q Young's Peak		-	70	210	280
Fruitland Mesa	5011 Gould Reservoir	63	270	840	570	1,680
	5012 Cedar Point	63	20	60	40	120
	5013 Iron Canyon	63	-	230	690	920
	5014 Poison Springs	63	-	-	1,450	1,450
	5017 Green Mountain	63	-	11,760	1,680	13,440
	5038 Red Canyon	63	-	-	80	80
	5039 Onion Valley	63	-	-	40	40

Note: Methodology for this table is located in appendix 5. This table includes only allotments in crucial areas. A breakdown of other allotments can be found in table 2-15.

TABLE 2-13
DEER CRUCIAL AREAS AND THEIR PRESENT BROWSE CONDITION (cont.)

Crucial Area	Allotment Name & No.	Game Management Unit	Acres Good	Fair	Poor	Total
Black Ridge	4516 North Fork: Subunit M Deer Basin, Smith Fork Pasture	63	595	1,860	1,270	3,725
	5020 Black Ridge	63	1,100	3,435	2,340	6,875
	5022 Rabbit Gulch	63	-	825	425	1,250
Dry Fork Escalante	5502 Sandy Wash	62	-	730	1,830	2,560
	5505 Transfer	62	-	570	1,430	2,000
	5507 Pipeline	62	770	-	2,310	3,080
	5513 Dry Creek Basin	62	-	500	1,260	1,760
	5516 Piney	62	-	680	-	680
Highway 90	5507 Pipeline	62	1,340	-	4,020	5,360
	5521 Highway 90, Pastures 4 & 6	62	-	280	720	1,000
Happy Canyon	5517 Spring Creek Canyon	62	-	125	315	440
	5522 Beaver Hill	62	-	-	2,160	2,160
Along Highway 550	5529 Log Hill	62	-	-	120	120
	5530 Billy Creek	65	-	-	240	240
	5552 Dallas	65	-	-	80	80
	5553 Fisher Creek	62	-	480	-	480
	5557 Alkali	65	-	-	160	160
	5560 Cookie Tree	65	-	-	280	280
	5572 McKenzie Creek	65	-	-	110	110
Cerro Summit	5003 Selig Canal: Subunit T Rawhide-Coffeepot	64	480	-	-	480
	5569 Hairpin	65	-	140	360	500
	TOTALS		4,575	40,095	69,075	113,745

TABLE 2-14
ELK CRUCIAL AREAS AND THEIR PRESENT BROWSE CONDITION

Crucial Area	Allotment Name & No.	Game Management Unit	Acres Good	Fair	Poor	Total
Leroux Creek	4503 Stingley Creek	52	-	60	180	240
	4549 Dry Creek	521	-	140	420	560
Horse Park	4504 Leroux Creek	52	-	400	1,200	1,600
	4506 Oak Mesa: Subunit G	52	-	20	60	80
	4507 Jay Creek	52,521	-	120	360	480
Oak Mesa	4507 Jay Creek	52,521	-	400	1,200	1,600
	4509 Upper Jay Creek	52,521	-	75	225	300
Wakefield Mesa	4513 Stevens Gulch: Subunit I Roatcap	521	-	450	1,350	1,800
Fry Mesa	4513 Stevens Gulch: Subunit I Roatcap	521	-	20	60	80
	Subunit J Terror Creek		-	60	180	240
Terror Creek	4513 Stevens Gulch: Subunit J Terror Creek	521	-	310	930	1,240
	4515 Freeman Gulch	521	-	70	210	280
Paonia Reservoir	4520 Spring Creek	521	-	30	90	120
Watson Flats	None	53	-	-	-	-
Minnesota Creek	4527 Jumbo Mountain	53	-	280	840	1,120
	4528 Oak Ridge	53	-	80	240	320
Reynolds Creek	4529 Reynolds Creek	53	-	140	420	560
	4530 McDonald Mesa	53	-	130	390	520
	4540 North Saddle Peak	53	-	30	90	120
	TOTALS		-	2,815	8,445	11,260

Note: Methodology for this table is located in appendix 5. This table includes only allotments in crucial areas. A breakdown of other allotments can be found in table 2-15.

TABLE 2-15
PRESENT BROWSE CONDITION IN THE ES AREA: NONCRUCIAL AREAS

Allotment Name & No.	Game Management Unit	Acres			
		Good	Fair	Poor	Total
4001 Dominguez	62	-	13,660	34,275	47,935
4002 Lower Escalante	62	-	480	1,210	1,690
4006 Dry Mesa	62	-	4,255	10,680	14,935
4007 Sawmill Mesa	62	-	3,220	8,075	11,295
4008 25 Mesa	62	-	2,155	5,410	7,565
4010 Monitor Mesa	62	-	4,360	10,935	15,295
4012 Canal	62	-	1,225	3,065	4,290
4013 Ben Lowe	62	-	750	1,885	2,635
4014 Joker	62	-	525	1,310	1,835
4015 White Ranch	62	-	120	295	415
4016 Wells Gulch	411, A-82	-	305	755	1,060
4017 Alkali Flats	411, 52, A-82	-	2,820	7,080	9,900
4022 Petrie Mesa	411, 52, 64, A-82	-	1,940	4,865	6,805
4024 Dirty George	411, A-82	-	2,385	-	2,385
4025 Ward Creek-Doughspoon	411, A-82	-		4,230	4,230
4026 Escalante Canyon	62	-	305	755	1,060
4501 Milk Creek	52	-	30	75	105
4502 Surface to Leroux	52	-	805	2,425	3,230
4503 Stingley Gulch	52	-	270	810	1,080
4504 Leroux Creek	52	-	640	1,915	2,555
4505 Juniper Knob	52	-	-	120	120
4506 Oak Mesa	52	-	335	1,015	1,350
4507 Jay Creek	52, 521	-	2,300	6,905	9,205
4509 Upper Jay Creek	52, 521	-	105	325	430
4511 Overland	521	-	40	120	160
4512 East Roatcap	521	-	-	30	30
4513 Stevens Gulch	521	-	1,635	4,920	6,555
4514 Upper Terror Creek	521	-	-	30	30
4515 Freeman Gulch	521	-	155	465	620
4516 North Fork	411, 521, 63, 64, A-82	-	2,125	6,365	8,490
4517 Coal Gulch	521	-	1,705	5,115	6,820
4518 Pilot Creek	521	-	-	45	45
4519 Muddy Creek	521	-	125	375	500
4520 Spring Creek	521	-	30	90	120
4521 Stock Driveway	521	-	30	90	120
4522 Downing	521	-	30	90	120
4523 Williams Creek	521	-	25	85	110
4524 Deep Creek	521	-	-	15	15
4525 Anthracite Creek	521	-	260	780	1,040
4526 Crystal Creek	521, 53	-	110	335	445
4527 Jumbo Mountain	53	-	995	2,995	3,990
4528 Oak Ridge	53	-	900	2,700	3,600
4529 Reynolds Creek	53	-	300	900	1,200
4530 McDonald Mesa	53	-	575	1,730	2,305
4531 Popp Ranch	53	-	65	200	265
4532 McDonald Ranch	53, 63	-	440	1,320	1,760
4536 West Young's Peak	53	-	25	85	110
4537 Young's Peak	53, 63	-	630	1,890	2,520
4538 Missouri Flats	53	-	30	90	120
4539 Cottonwood Creek	53	-	30	90	120
4540 North Saddle Peak	53	-	60	180	240
4541 Sunshine Mesa	52	-	-	40	40
4543 South Saddle Peak	63	-	55	165	220
4549 Dry Creek	52	-	775	2,335	3,110
5002 Dedication Site	64	305	960	650	1,915
5003 Selig Canal	64	3,265	-	-	3,265
5008 Brush Point	64	-	-	5,775	5,775
5010 Dead Horse	63	155	475	325	955
5011 Gould Reservoir	63	450	1,415	960	2,825

Note: Methodology for this table is located in appendix 5. This table includes only allotments with pinyon-juniper, sagebrush, or mountain shrub. In addition, this table includes some, but not all, of the allotments located in crucial areas. Allotments that fall entirely within crucial areas are not included but can be found in tables 2-13 and 2-14, which provide a breakdown by crucial area.

TABLE 2-15
PRESENT BROWSE CONDITION IN THE ES AREA: NONCRUCIAL AREAS (CONT.)

Allotment Name & No.	Game Management Unit	Acres			
		Good	Fair	Poor	Total
5012 Cedar Point	63	100	310	210	620
5013 Iron Canyon	63	-	-	1,335	1,335
5014 Poison Spring	63	-	1,570	-	1,570
5015 Grizzly Gulch	63	-	-	1,930	1,930
5016 Black Canyon	63	70	220	150	440
5017 Green Mountain	63	-	18,220	2,605	20,825
5025 Fruitland Mesa	63	-	80	-	80
5027 Adobe	63	50	150	100	300
5028 Doug Creek	63	65	200	135	400
5029 Spring Gulch	63	210	660	450	1,320
5030 Bostwick Park	64	330	1,030	705	2,065
5033 Pinyon Spring	64	-	1,030	-	1,030
5037 Black Mesa	63	60	180	120	360
5040 Pine Ridge	63	-	30	30	60
5041 East Gould Reservoir	63	100	310	210	620
5043 Collins	63	30	100	70	200
5044 Big Pasture	63	30	100	70	200
5045 Black Bullet	63	-	70	20	90
5046 Big Gulch	52, 63	-	30	30	60
5047 Mesa Creek	63	50	150	100	300
5048 Morrow Point	63	25	75	55	155
5049 Smith Fork	63	70	225	155	450
5050 Allen Reservoir	63	30	100	70	200
5502 Sandy Wash	62	-	1,685	4,225	5,910
5503 Green	62	-	130	320	450
5504 Roatcap	62	-	715	1,795	2,510
5505 Transfer	62	-	680	1,710	2,390
5507 Pipeline	62	4,740	-	14,210	18,950
5508 Government Spring	62	-	645	1,615	2,260
5510 Bald Hills	62	-	60	145	205
5511 Shavano Mesa	62	-	210	530	740
5512 Franklin Mesa	62	-	1,000	2,520	3,520
5513 Dry Creek Basin	62	-	-	5,425	5,425
5514 East Fork Dry Creek	62	-	40	90	130
5515 Olathe Reservoir	62	-	55	130	185
5516 Piney	62	-	8,335	-	8,335
5518 Dave Wood	62	-	730	1,835	2,565
5520 Lower Horsefly	62	-	5,535	-	5,535
5521 Highway 90	62	-	1,770	4,445	6,215
5522 Beaver Hill	62	-	-	19,785	19,785
5523 Horsefly	62	-	185	455	640
5524 Duckett Draw	62	-	80	195	275
5525 Dry Creek	62	-	-	25	25
5529 Log Hill	62	-	-	4,345	4,345
5530 Billy Creek	65	-	-	3,310	3,310
5532 Burro Ridge	65	-	60	140	200
5533 Onion Lakes	65	-	60	140	200
5534 Shin Park	65	-	135	335	470
5535 Cedar Creek	65	-	50	120	170
5540 Dry Gulch	65	-	-	4,690	4,690
5543 Waugh	65	-	-	15	15
5545 Henshaw	65	-	50	120	170
5546 Waterdog Basin	65	-	115	285	400
5548 Washboard Rock	65	-	-	40	40
5549 High Park	65	-	-	40	40
5551 Dexter Creek	65	-	-	65	65
5552 Dallas	65	-	70	170	240
5555 Taylor Draw	65	-	-	325	325
5556 Burro Creek	65	-	35	85	120
5557 Alkali	65	-	-	485	485
5559 South Fork	65	-	35	85	120
5560 Cookie Tree	65	-	-	640	640
5561 East Fork	70	-	-	80	80
5562 Hillside	65	-	45	115	160
5563 Moonshine Park	70	-	40	110	150
5564 Gravel Pit	62	-	-	40	40

TABLE 2-15
PRESENT BROWSE CONDITION IN THE ES AREA: NONCRUCIAL AREAS (CONT.)

Allotment Name & No.	Game Management Unit	Acres			
		Good	Fair	Poor	Total
5565 Tommy Creek	65	-	30	80	110
5566 Cow Creek	65	-	100	255	355
5567 Busted Boiler	62	-	-	40	40
5568 Baldy	65	-	70	185	255
5570 Cedar	65	-	605	1,520	2,125
5574 Tappan Creek	62	-	70	170	240
TOTALS		10,135	105,255	235,830	351,220

TABLE 2-16
SUMMARY TABLE OF PRESENT BROWSE CONDITION

Species	Type of Area	Acres			
		Good	Fair	Poor	Total
Deer	Crucial	4,575	40,095	69,075	113,745
Deer & Elk	Noncrucial	10,135	105,255	235,830	351,220
Elk	Crucial	-	2,815	8,455	11,260

Note: This table cannot be totaled to the bottom because of the repetition of some of the allotments.

TABLE 2-17
MULE DEER POPULATION STATUS IN THE ES AREA

	Game Management Units									
	411	52	521	53	62	63	64	65	70	Totals
Estimated total population a/	1,100	3,178	1,608	5,215	10,759	2,424	1,337	4,620	7,042	37,283
Estimated population NRL b/	242	699	353	1,147	4,841	1,212	660	2,310	281	14,913
Average legal harvest total	220	675	402	1,238	2,420	507	278	1,094	1,400	8,234
Percent harvest, NRL c/	22	22	22	22	45	50	50	50	4	32
Average legal harvest, NRL c/	48	148	88	272	1,089	253	139	547	56	2,640

Source: Colorado Division of Wildlife (DOW), Big Game Harvest Statistics; estimates by DOW and BLM personnel.
Note: Methodology for determining big game populations can be found in appendix 5.
a/ Base population as of June 1.
b/ Estimated population to use NRL at least part of each year.
c/ Harvest attributed to habitat provided by NRL.

NRL in the ES area are primarily important as winter range for deer. Deer use this winter range predominantly between 6,000 and 9,000 feet in elevation for an average of 5.5 months each year (November into April). In the ES area, 29 crucial or winter concentration areas have been identified. Deer seasonal use areas, crucial winter ranges, and GMUs are shown on map 2-8. Deer crucial areas and current livestock grazing allotments, class of use, and season of use are summarized in table 2-18.

The vegetative types present in the crucial areas are the sagebrush and pinyon-juniper along the Uncompahgre Plateau and the mountain shrub near Paonia. In addition the interspersion areas throughout the mesas and foothills receive extensive deer use. The areas receiving the highest deer use are the south facing slopes and the chainings.

The browse species used by deer in the ES area are primarily several species of big sagebrush, mountain mahogany, Gambel oak, snowberry, serviceberry, bitterbrush, rabbitbrush, four-winged saltbush, horsebrush, pinyon pine, and juniper. A summary of seasonal food of mule deer is presented in table 2-19.

Elk

In comparison with the larger herds found elsewhere in Colorado, the present elk numbers in the ES area are not great. However, elk are currently increasing throughout the area. One area with a dynamic population is the Uncompahgre Plateau. Very few elk were seen or harvested there up until ten years ago; since that time the herd has increased dramatically, and elk appear to be spreading over most of the plateau. Population estimates for each of the GMUs are presented in table 2-20, based on the average harvest for the past six years. The elk population dependent on NRL is estimated to be about 1,200 at the present time.

Elk generally range above 7,000 feet elevation, with some exceptions, such as the Billy Creek Wildlife Management Area, the Log Hill chainings, and Bostwick Park. NRL provide winter range for the elk for an average of two months of the year, depending upon the snow depth. Most elk crucial areas in the North Fork Valley are the same as those for the deer. Elk seasonal use areas and crucial winter ranges are shown on map 2-9; GMUs are shown on map 2-8. Elk crucial winter areas are listed in table 2-21.

As shown in table 2-22, grass composes at least two-thirds of the diet of elk during all seasons according to a recent study conducted in the San Luis Valley (Hansen and Reid 1975, pp. 43-47). Abundance of grasses for elk is the same as abundance of grasses for cattle (see Vegetation).

TABLE 2-22.—*Summary of seasonal foods of elk (near Fort Garland, Colo.)*

Class of forage	Seasonal diets (percent)			
	Winter	Spring	Summer	Autumn
Tree	5	8	1	6
Shrub and halfshrub	17	20	12	22
Forb	2	1	4	5
Grass	76	71	83	67
Total	100	100	100	100

Source: Hansen and Reid 1975, p. 46.

Pronghorn Antelope

Antelope were first successfully restored into the northwest portion of the ES area on February 16, 1949. From this initial transplant of seventeen animals and subsequent transplants in December 1949, February 1950, and January 1970, the animals increased to a huntable population. Up until three years ago, the herd had been stable and sustaining itself. The herd then began to decline without any apparent cause, and the downward trend appears to be continuing. Present population of antelope is approximately 250 animals.

Antelope are dependent on NRL twelve months of the year. DOW antelope management area A-82 encompasses the entire acreage of the antelope range in the ES area (approximately 85,000 acres). Antelope habitat is primarily the desert shrub type, with some summer habitat in the lower elevations of pinyon-juniper. Two possible winter concentration areas have been identified through wildlife observation reports and verbal communication with WCOs. They are in allotments 4016 Wells Gulch (1,600 acres) and 4017 Alkali Flats (640 acres). The concentration areas are shown on map 2-9, along with the A-82 boundaries.

Antelope feed primarily on forbs and browse, with the volume of browse in the diet increasing in the winter as forbs become less palatable (Hoover, Till, and Ogilvie 1959). Food habit studies conducted in the San Luis Valley (Bear 1973, pp. 44-45) indicated that shrubs are the most abundant forage in antelope diets yearlong, that forbs are also important, but that grasses are in-

TABLE 2-18
DEER CRUCIAL WINTER AREAS WITH CURRENT ALLOTMENTS,
LIVESTOCK CLASS, AND SEASON OF USE

Crucial Area a/	Allotment	Livestock Class b/	Season of Use
Leroux Creek	4503 Stingley Gulch	C	05/10-06/09
	4549 Dry Creek	C	05/12-06/15
			10/16-10/20
Horse Park	4504 Leroux Creek	C	06/01-08/31
	4505 Leroux Common (combined into 4504 Leroux Creek)*	C	05/16-06/15 05/20-06/16
	4506 Oak Mesa	S	01/11-02/10 05/01-06/15 06/23-06/30 08/15-08/28
Oak Mesa	4506 Oak Mesa	S	See above
	4507 West Jay Creek (combined with other units into 4507 Jay Creek)*	C	10/21-10/31
	4509 Upper Jay Creek	C	05/20-09/30
Wakefield Mesa	4513 Stevens Gulch	C	05/01-06/30
Fry Mesa	4513 Stevens Gulch	C	10/16-10/25
Terror Creek	4513 Stevens Gulch	C	10/16-10/25
	4515 Freeman Gulch	C	06/01-10/31
Paonia Reservoir	4520 Spring Creek	C	10/16-10/20
Watson Flats	None currently	-	-
Minnesota Creek	4527 Jumbo Mountain	C	05/11-06/15
	4528 Oak Ridge	C	05/16-06/15 10/16-10/30
Reynolds Creek	4529 Reynolds Creek	C	06/11-06/20 10/06-10/07
	4530 McDonald Mesa	C	06/01-06/20
	4537 Young's Peak	C	05/15-06/14
	4540 North Saddle Peak	C	06/01-08/31

a/ Identified by geographical features.
b/ C = cattle; S = sheep.
* Status in proposed action.

TABLE 2-18
DEER CRUCIAL WINTER AREAS WITH CURRENT ALLOTMENTS,
LIVESTOCK CLASS, AND SEASON OF USE (cont.)

Crucial Area a/	Allotment	Livestock Class b/	Season of Use
Deer Basin	4019 Deer Basin (4516 North Fork: M Deer Basin Subunit)*	S	12/21-02/28 04/16-05/20 03/01-04/13
	Alkali Flats	S	03/01-05/07 12/01-02/28
Negro Mesa	4017 Alkali Flats	S	See above
Oak Creek	4024 South Branch (combined into 4024 Dirty George)*	C	05/16-05/31 11/01-11/15
	4025 Ward Creek- Doughspoon	C	05/02-06/15 10/15-11/17
Camp Ridge	4001 Dominguez	C	03/01-05/30 10/16-02/28 04/01-10/03 11/10-12/01
Dry Mesa	4005 Negro Draw (combined into 4017 Alkali Flats)*	C	05/21-05/31 10/16-11/30
Cottonwood Mesa	4007 Sawmill Mesa	C	05/01-05/31 10/16-12/15
	4008 25 Mesa		05/06-05/31 10/15-02/28
Monitor Mesa	4010 Monitor Mesa	C	05/16-05/31 10/16-11/30
	4015 Monitor Creek (4015 White Ranch)*	C	09/01-09/16
Winter Mesa	4010 Monitor Mesa	C	See above
Camel Back	4012 Canal	C	05/15-06/01 10/16-11/15
Pea Green	4012 Canal	C	See above
	4013 Ben Lowe	C	05/21-05/31 10/16-11/30

* Status in proposed action.

TABLE 2-18
DEER CRUCIAL WINTER AREAS WITH CURRENT ALLOTMENT,
LIVESTOCK CLASS, AND SEASON OF USE (cont.)

Crucial Area a/	Allotment	Livestock Class b/	Season of Use
Fruitland Mesa	5011 Gould Reservoir	C	05/05-06/30
	5012 Cedar Point	C	05/10-07/09
	5013 Iron Canyon	C	05/06-06/30
	5014 Poison Springs	C	05/15-07/14 09/01-10/31
	5017 Green Mountain	S/C	05/03-11/25
	5038 Red Canyon	C	05/10-10/30
	5039 Onion Valley	C	07/01-09/05
Dry Fork Escalante	5502 Sandy Wash	S	03/01-03/16 12/01-02/28
	5505 Transfer	C	10/16-11/15
	5506 Cushman (combined into 5507 Pipeline)*	S	03/01-03/15 01/27-02/28
	5513 Dry Creek Basin	S	12/11-02/16
	5516 Piney	C	06/01-10/30
Highway 90	5507 Pipeline	S	03/16-04/30 12/07-12/13
	5521 Highway 90	S	04/02-06/07
Happy Canyon	5522 Beaver Hill	S	05/16-06/30 10/01-10/30
	5517 Spring Creek Canyon	C	05/29-11/01
Log Hill Mesa Area	None currently	-	-
Ridgway Area	None currently	-	-
Along Highway 550	5530 Billy Creek	-	-
	5557 Alkali	C	12/15-02/28
	5560 Cookie Tree	C	07/20-10/04
	5572 McKenzie Creek	C	05/01-10/31
Cerro Summit	5569 Hairpin	S	05/16-05/30
Black Ridge	5020 Black Ridge	S	11/16-12/15 12/01-05/30
	5022 Rabbit Gulch	C	11/10-01/18

* Status in proposed action.

TABLE 2-19
SUMMARY OF SEASONAL FOODS OF MULE DEER
(near Fort Garland, Colorado)

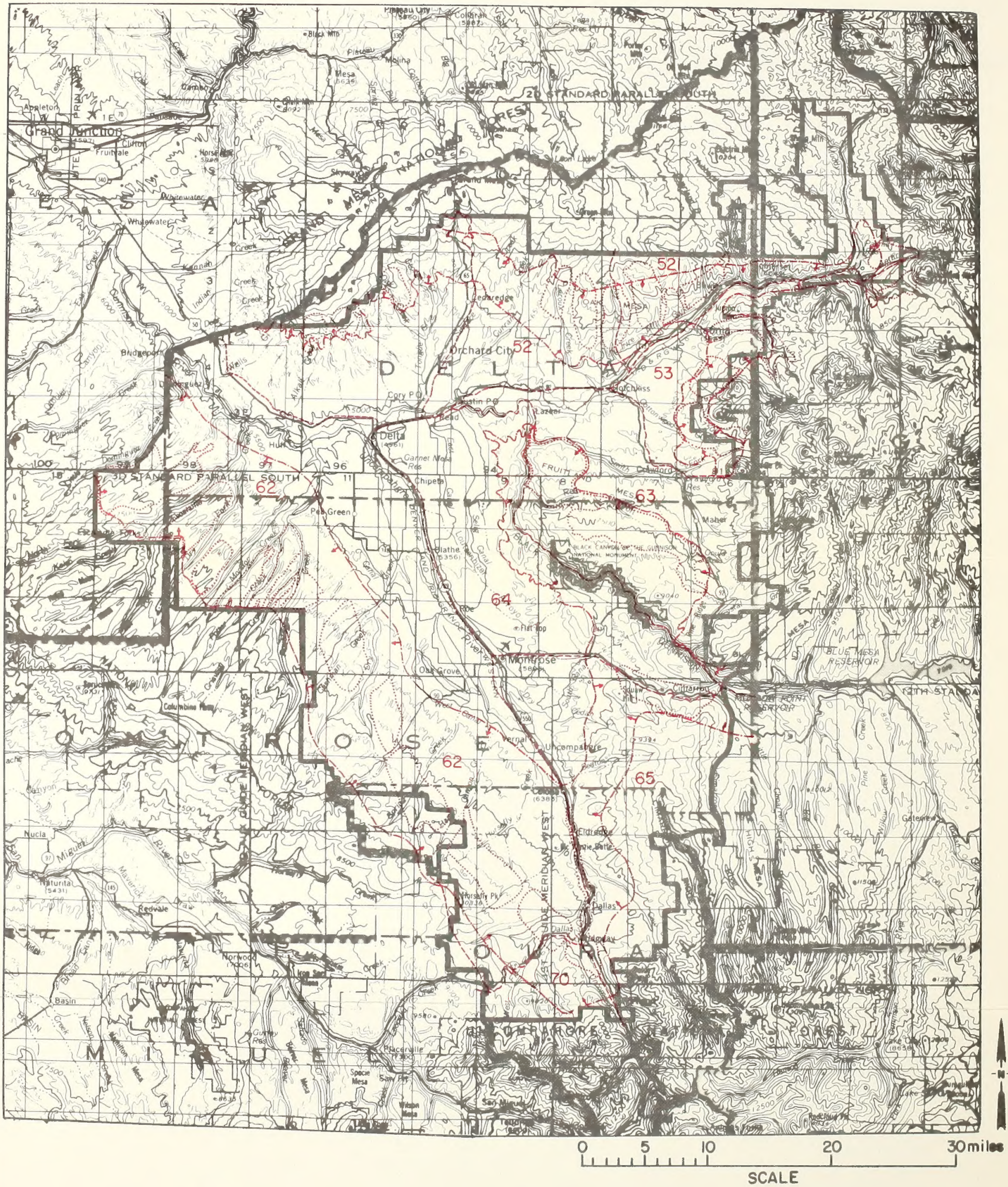
Class of Forage	Seasonal Diets (%)			
	Winter	Spring	Summer	Autumn
Tree	23	14	7	14
Shrub & halfshrub	70	74	38	77
Forb	2	4	12	0
Grass	5	8	43	9
Total percent	100	100	100	100

Source: Hansen and Reid 1975, p. 45.

TABLE 2-20
ELK POPULATION STATUS IN THE ES AREA

	Game Management Units									
	411	52	521	53	62	63	64	65	70	TOTAL
Estimated June 1 Population	225	940	2,030	855	565	160	120	1,635	1,220	7,750
Estimated Population, NRL a/	34	141	305	128	85	24	18	245	183	1,163
Average Legal Harvest Total	60	250	540	227	150	42	32	435	325	2,061
Percent Harvest NRL b/	15	15	15	15	15	5	5	10	10	12
Average Legal Harvest, NRL	9	38	81	34	23	2	2	44	33	266

Source: Colorado Division of Wildlife (DOW), Big Game Harvest Statistics; estimates by DOW and BLM personnel.
Note: Methodology for determining big game populations can be found in appendix 5.
a/ The maximum estimated population to use NRL at least part of the year.
b/ The harvest attributed to habitat provided by NRL.



Map 2-8. Deer Winter Range

LEGEND:

Deer Winter Range

Crucial Deer Winter Range

Game Management Units

65

DEER WINTER RANGE

TABLE 2-21
ELK CRUCIAL WINTER AREAS WITH CURRENT ALLOTMENTS,
LIVESTOCK CLASS, AND SEASON OF USE

Crucial Area a/	Allotment	Livestock Class b/	Season of Use
Leroux Creek	4503 Stingley Gulch	C	05/10-06/09
	4549 Dry Creek	C	05/12-06/15
			10/16-10/20
Horse Park	4504 Leroux Creek	C	06/01-08/31
	4505 Leroux Common (combined into 4504 Leroux Creek)*	C	05/16-06/15 05/20-06/16
	4506 Oak Mesa	S	01/11-02/10 05/01-06/15 06/23-06/30 08/15-08/28
Oak Mesa	4507 West Jay Creek (combined with other units into 4507 Jay Creek)*	C	10/21-10/31
Wakefield Mesa	4513 Stevens Gulch	C	05/01-06/30
Fry Mesa	4513 Stevens Gulch	C	10/16-10/25
Terror Creek	4513 Stevens Gulch	C	10/16-10/25
	4515 Freeman Gulch	C	06/01-10/31
Paonia Reservoir	4520 Spring Creek	C	10/16-10/20
Watson Flats	None currently	-	-
Minnesota Creek	4527 Jumbo Mountain	C	05/11-06/15
	4528 Oak Ridge	C	05/16-06/15 10/16-10/30
Reynolds Creek	4529 Reynolds Creek	C	06/11-06/20 10/06-10/07
	4530 McDonald Mesa	C	06/01-06/20
	4540 North Saddle Peak	C	06/01-08/31

a/ Identified by geographical features.
b/ C = cattle; S = sheep.
* Status in proposed action.

significant. Table 2-23 summarizes plants utilized by antelope by season of the year.

Competition

Each of the large grazing mammals has specific grazing preferences and normally eats certain species of plants that are used by other animals to varying degrees. The degree to which these overlaps occur can be considered the degree of competition that exists between species. These overlaps are summarized in table 2-24, which is based on fecal samples in vegetative types similar to these found in the ES area (Hansen and Reid 1975). The following discussion is by season of the year by wildlife species.

WINTER. Winter is the most critical time for most wildlife species. The greatest stress is placed on the species at this time. Additional energy drains upon fat reserves, such as harassment, carrying young, and the increasing distances traveled in search of nutritious food, add to this stress. Therefore, plants with high nutritional values are sought by both wildlife and livestock. Because of this tendency for all species to seek the higher levels of protein available in browse species, the greatest diet overlaps occur during this time.

The most serious overlap in the ES area is between antelope and sheep. Antelope use the range yearlong, but sufficient water for bands of sheep is not available until winter when snow provides sufficient moisture. At the same time, vegetation is severely limited throughout the range. Therefore, the diet overlaps could be as much as 100 percent. "Antelope are in direct competition with sheep for forbs and browse" (U.S. Department of the Interior 1970).

Antelope and deer diets overlap to a great extent, but in the ES area habitat overlaps are considered to be insignificant.

Additional competition between species during the winter months is readily apparent if one studies table 2-24. The 29 areas (involving 54 grazing allotments) identified as deer and elk crucial winter range are listed in tables 2-18 and 2-21. Antelope crucial range is shown on map 2-9.

SPRING. The spring competition is almost as keen as the winter competition. All grazing animals begin using the first green shoots of spring, and thus are in direct competition with each other. This continues as the snows recede and the deer, elk, and cattle begin to move up along the mesas of the Uncompahgre Plateau and mountains throughout the ES area, eating the green shoots as they appear.

Deer prefer green grass that is free of stubble and utilize grazed pastures in preference to those in which old stubble remains. The grass species most preferred are orchard grass, June grass, and the wheatgrasses. (U.S. Department of the Interior 1974, pp. 19 and 34)

SUMMER. By summer, most livestock and wildlife are off NRL and on NFL. Diet overlaps, even though significant, are reduced by increased forage and better distribution of animals.

FALL. The spring migration upward is reversed in the fall, with the livestock moving down first, followed by the deer and elk as the snows become deeper. Once again, however, diet overlaps are reduced due to the lack of concentration areas.

Mountain Lion

There are a few mountain lions scattered throughout the ES area. Exact population data are lacking on this species due to the remoteness of its habitat and the secretiveness of the animal. There is no doubt about the usefulness this animal serves in the food chain by keeping mule deer populations in check (Burt and Grossenheider 1964, p. 83). Predator loss records indicate some loss of livestock to this animal.

Black Bear

This species ranges throughout the more remote, higher, and uncivilized portions of the ES area. Bear are well scattered and seldom seen except during the early fall when they can be readily found in the berry patches along creek bottoms. Bear can also be seen in the springtime, grazing in high meadows.

The black bear is primarily a vegetarian but will eat small mammals, an occasional deer, antelope, or the young of either species. In studies on western stock ranches, pinyon pine (seeds, bark, or foliage) and serviceberry were found to be the most used plants (Martin et al. 1951). In addition, bear utilize carrion, berries, and other fruits.

Some predation problems do occur when domestic sheep run in the high country during the summer. In the past, Division of Wildlife Services personnel have removed the bear doing damage. This no longer occurs. Private individuals, however, are allowed to remove the bear at any time of the year without a license in order to alleviate livestock losses.

TABLE 2-23
SUMMARY OF SEASONAL FOODS OF PRONGHORN ANTELOPE
(in Saguache County, Colorado)

Class of Forage	Seasonal Diets (%)		
	Spring	Summer	Fall - Winter
Shrub	67	53	94
Forb	31	44	3
Grass	1	1	1
Total percent	99	98	98

Source: Bear 1973, pp. 44-45.

TABLE 2-24
PERCENTAGE OF OVERLAP IN FORAGE UTILIZATION AMONG CATTLE, ELK, ANTELOPE, AND DEER AT VARIOUS SEASONS OF THE YEAR

Animal and Season Computed	Percent Overlap a/
Antelope Summer and Antelope Winter	0.73
Antelope Summer and Cattle Summer	0.09
Antelope Summer and Cattle Winter	0.16
Antelope Summer and Deer Winter	0.78
Antelope Summer and Elk Winter	0.19
Antelope Winter and Cattle Summer	0.02
Antelope Winter and Cattle Winter	0.11
Antelope Winter and Deer Winter	0.78
Antelope Winter and Elk Winter	0.10
Cattle Summer and Cattle Winter	0.56
Cattle Summer and Deer Winter	0.07
Cattle Summer and Elk Winter	0.10
Cattle Winter and Deer Winter	0.14
Cattle Winter and Elk Winter	0.24
Deer Winter and Elk Winter	0.31

Source: Hansen 1975.
a/ A 78 percent overlap means that, of the total number of species of plants eaten by two different species of animals, 78 percent of the total species of plants eaten will be utilized by both species of animals.

Bear harvest statistics for 1971-74 are presented in table 2-25. The bear population seems to be holding steady or increasing slightly in the ES area.

SMALL MAMMALS

Map 2-9 shows the location of the small game management units (SGMUs) in relation to the ES area. Harvest data for small mammals in the ES area are shown in table 2-26. Because of the lack of population densities in the ES areas, these tables present how many animals were harvested in 1974 as representative of the population in the area.

Small Game Species

There are only three species hunted by humans for food in the ES area: cottontail rabbit, snowshoe hare, and pine (red) squirrel.

Every square mile of the ES area is either occupied by or capable of being occupied by cottontails, with the possible exception of the urban areas. Chaining operations have created local heavy concentrations of cottontails, due to improved brush and herbaceous cover. The snowshoe hare occupies or could occupy the ES area between 8,000 and 10,000 feet elevation. The majority of the land in this altitude range is administered by either BLM or the U.S. Forest Service (USFS).

Population data are lacking for both the cottontail and the snowshoe; rough estimates from studies elsewhere in Colorado could be obtained but would have little real value. The population level tends to be cyclic, as it is for many prey species.

Both the cottontail and the snowshoe eat almost any green herbaceous growth. They are preyed upon by both aerial and ground predators.

Pine (red) squirrels occupy the coniferous forests of the ES area. Population figures are lacking, but DOW personnel in this region indicate that where pine squirrels are present, they exist in population densities of two per acre of coniferous forest. Squirrels subsist mostly on seeds of coniferous trees, such as pinyon pine, spruce, ponderosa pine, and Douglas fir.

Other Species

Beaver, coyote, and bobcat are also economically important to a few individuals within the ES area for their furs. The latter two species are of major concern to livestock owners because of their depredations on calves and sheep.

The remaining small mammals of the ES area are considered to be varmints and/or furbearers. Although an important source of recreation, they are not as important economically as the larger game species; therefore, very few studies on them have been done. Although specific population numbers are lacking for these mammals, all of the species appear to be increasing throughout the ES area. This statement is based upon professional judgement and discussions with WCOs and with ranchers and other landowners in the area.

BIRDS

Harvest data for upland game birds and waterfowl are presented in table 2-26; population densities for these species are lacking for the ES area. No population information is available on raptors or on other nongame birds.

Waterfowl

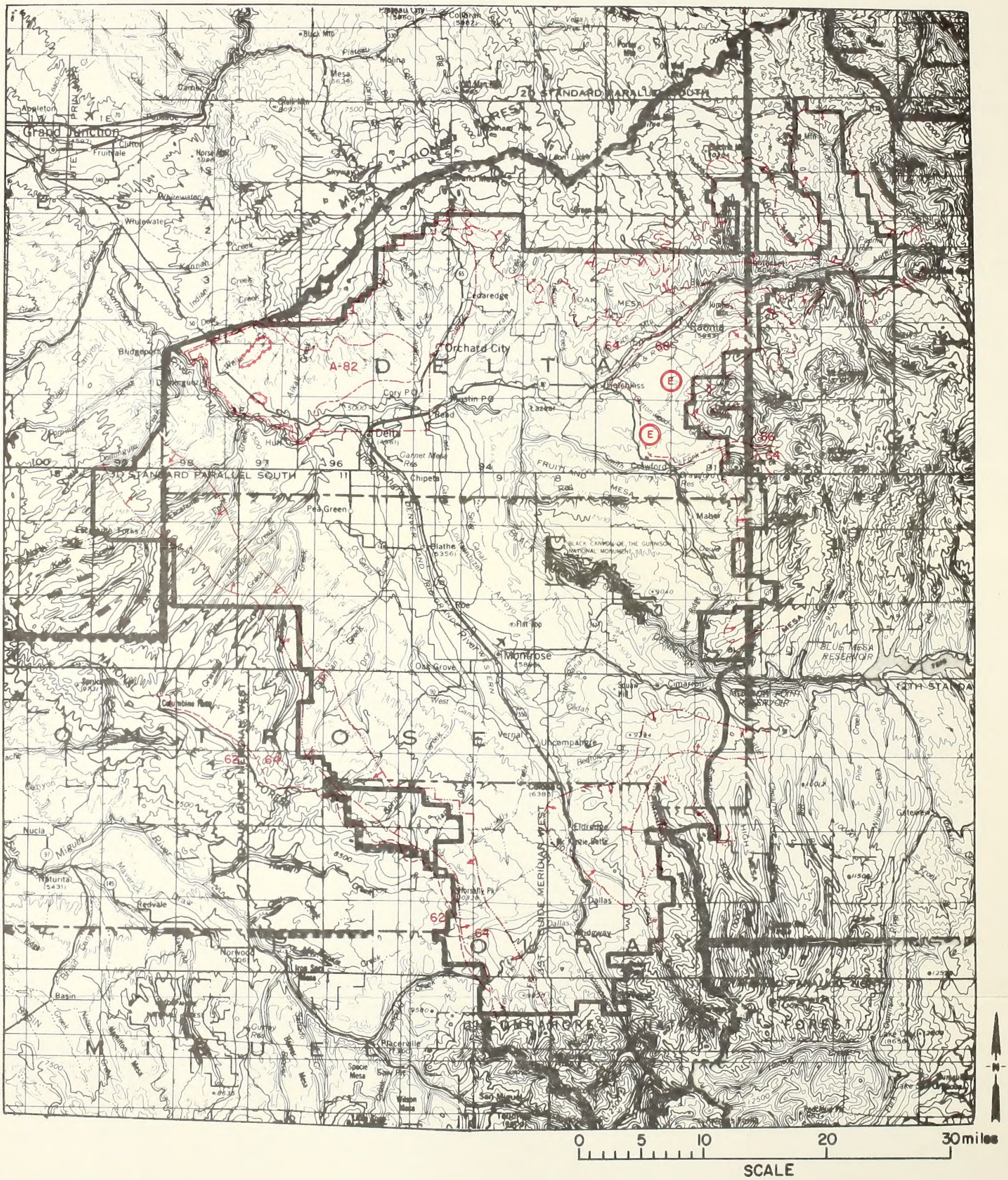
The Uncompahgre Basin is not noted for its waterfowl production; however, it is a stopover area for the Pacific flyway. Some species that do nest in the area include the Canadian goose, mallard, gadwall, pintail, green-winged teal, blue-winged teal, and cinnamon teal. These are not large populations due to the limited water in the area suitable for nesting. Waterfowl nesting pairs have been sighted on nearly every water body throughout the ES area that has a permanent source of free water.

Upland Game Birds

Band-tailed pigeons are summer residents of the ES area. These birds are present in scattered flocks throughout the cultivated farmland in the valley during the late spring and early fall; however, the birds are restricted to their nesting areas within the coniferous-forest type and nearby feeding areas during most of the summer. Wild fruit, mast, and agricultural crops are important as band-tailed pigeon food.

Mourning doves are common throughout the ES area from late spring to early fall. Their primary habitat requirements are met throughout the area, but water distribution on the Uncompahgre Plateau is a limiting factor. No data are available on densities of mourning doves on the Uncompahgre Plateau (McKean and Baker 1972) or anywhere else in the ES area.

Blue grouse are few in numbers due to the limited coniferous forest available thoughout the ES area. The nesting habitat of blue grouse is



LEGEND:

- Elk Winter Range
- Elk Calving Area
- Antelope Yearlong Range
- Antelope Critical Area
- A-82 Boundaries
- (E) Endangered Species Black-Footed Ferret
- 62 Small Game Management Units

RANGES OF ELK, ANTELOPE, & ENDANGERED SPECIES

Map 2-9. Ranges of Elk, Antelope, and Endangered Species

TABLE 2-25
HARVEST STATISTICS FOR BEAR
(1971 - 1974)

Year	GMUs 411	52	521	62	63	64	65	70	Total
1971				11				2	13
1972		4		24	5		2	6	38
1973		5	7	13	1		3	2	31
1974	1	5	19	8	3		1	1	30

Source: DOW, Big Game Harvest Data Books (1971-1974).

TABLE 2-26
HARVEST OF SMALL MAMMALS
BY SMALL GAME MANAGEMENT UNIT (1974)

Species or Group	GMU 64	66	Total
SMALL GAME			
Duck	19,479	5,546	25,025
Dove	10,314	1,409	11,723
Turkey	5	-	5
Pheasant	16,936	295	17,231
Gambel's Quail	2,027	-	2,027
Blue Grouse	2,239	2,942	5,181
Ptarmigan	156	303	459
Cottontail Rabbit	11,958	8,435	20,393
Snowshoe Hare	194	1,048	1,242
Pine (Red) Squirrel	98	1,114	1,212
FURBEARERS			
Gray Fox	61	-	61
Badger	33	155	188
Trapping			
Beaver	462	121	583
Red Fox	2	7	9
Marten	2	34	36
Mink	10	18	28
Muskrat	3,869	761	4,630
Striped Skunk	284	29	313
Long-tailed Weasel	-	5	5
Short-tailed Weasel	6	8	14
VARMINTS			
Marmot	785	1,981	2,766
Bobcat	33	356	389*
Raccoon	403	164	567*
Coyote	845	2,752	3,597*
Prairie Dog	13,983	6,260	20,243
Jackrabbit	1,175	5,497	6,672
Porcupine	1,817	1,884	3,701
Crow	738	33	771
Magpie	1,059	3,998	5,057

Source: DOW, 1974 Colorado Small Game, Furbearers, Varmints Harvest Book.
* Includes some animals that may have been taken by trapping.

usually moist stream bottoms. Blue grouse foods include mostly insects in the summer and conifer needles in the winter.

Sage grouse are located in three regions of the ES area. The first is south of Crawford Reservoir along State Highway 92, the second is on Sims Mesa southwest of Montrose, and the third is the Bostwick Park area. Very few birds have been seen in recent years on Sims Mesa and Bostwick Park, but in the Crawford area there have been enough seen to indicate an increase in the population. Sage grouse depend on sagebrush yearlong for food and nesting cover.

Chukars were introduced into Escalante Canyon, Shin Park, Wells Gulch, and the Black Ridge area; huntable populations were obtained. Current observations indicate that these birds have scattered and are inhabiting additional areas each year. Prolific seed producing plants, such as cheatgrass, are important chukar food as are other species, such as Russian thistle, that are common to disturbed areas.

A small remnant population of wild turkeys is present in the Pleasant Valley area in the southwestern portion of the ES area. These birds use NRL in the Horsefly Peak and Happy Canyon areas. Turkeys are also thought to be in the mesa country south of Paonia, but few have been seen in recent years.

Raptors

Raptors which are yearlong residents of the ES area include the golden eagle, red-tailed hawk, marsh hawk, Cooper's hawk, and great-horned owl. The Swainson's hawk and American kestrel are common summer residents, and the roughlegged hawk and northern bald eagle are common winter residents. Species uncommon in the ES area include goshawk, sharp-shinned hawk, burrowing owl, and long-eared owl. Species rare in the area are ferruginous hawk, osprey, pigeon hawk, and screech owl. (McKean and Baker 1972.)

The cliffs and precipitous rock formations scattered throughout the ES area are used as nesting and perching sites by the prairie falcon, golden eagle, and red-tailed hawk. The Swainson's hawk, American kestrel, and great-horned owl nest in trees throughout the valley.

The prey affected by livestock grazing, and on which raptors are dependent, are the prairie dog, the cottontail rabbit, the snowshoe hare, all species of birds, and the carcasses of the larger big game animals.

Other Nongame Birds

A list of birds known to be or that could be present in the ES area is available at the Montrose District Office. Information is insufficient on most species (other than endangered) to determine population status or specific habitat requirements.

REPTILES

The reptilian fauna of the ES area is extremely limited, mostly because of the severe climatic conditions. Garter snakes are common around permanent water. A list of the reptiles known to occur in the ES area is available from the Montrose District Office.

ENDANGERED SPECIES

Within the ES area, there are three species that are currently on the Endangered Species List of the U.S. Fish and Wildlife Service (USFWS): the American peregrine falcon (*Falco peregrinus anatum*), the whooping crane (*Grus americana*), and the black-footed ferret (*Mustela nigripes*). The river otter (*Lutra canadensis*) is on the state of Colorado endangered list.

Possible nesting sites are available for the peregrine falcon in several parts of the ES area, most notably the Black Canyon of the Gunnison, Escalante Canyon, and eastern Ouray County.

The whooping crane is a rare migrant through the ES area. In the fall of 1975, a crane was spotted with its adopted family of sandhill cranes in the Crawford area. This was the only crane seen in the area, but it is possible that more came through without being observed.

The black-footed ferret preys on the prairie dog, which is attracted to areas of subclimax vegetation caused by grazing. Although no confirmed sightings have been made, the black-footed ferret could be found in prairie dog concentration areas.

Three unconfirmed sightings of black-footed ferrets near Hotchkiss have been reported, and several "trenches" were found. The discovery of these trenches led to an investigation of the area by DOW, USFWS, and BLM personnel in late 1975 and early 1976. The trenches located were looked at and discussed with other personnel more familiar with prairie dog habits who indicated that these trenches could have been made by prairie dogs and not black-footed ferrets.

However, because of the unconfirmed sightings and the possibility that black-footed ferrets could have made the trenches, a wildlife trainee was given the job in the summer of 1976 of inventorying prairie dog towns and their species composition and spotlighting for ferrets at night. This study resulted in some baseline data that can be used in the future, but no sightings of ferrets were recorded. (For further information see File 6840, report by S. R. Smith 1976, at the Montrose District Office.)

In all of the investigations, no conclusive evidence of the presence of black-footed ferrets was found. S. J. Bissell (1976) states that "no area can be considered essential habitat until confirmation of black-footed ferrets is made. The (Paonia and Hotchkiss area) can be given special consideration" because of the sightings and evidence found there.

The river otter has recently been introduced into the Gunnison River near Black Canyon of the Gunnison. This species is currently on the Colorado DOW Endangered Species List and is protected throughout the state.

Aquatic and Riparian

Major rivers, lakes, reservoirs, streams, and the aquatic organisms and riparian vegetation associated with them are described in this section. The majority of aquatic habitat on NRL consists of small streams, and these areas can be drastically affected by grazing programs. In this semiarid environment, small stream aquatic habitats are closely related to and directly dependent on their associated riparian vegetation. The conditions, impacts, and changes of small stream environments closely parallel these same aspects of riparian communities. These close relationships are most adequately considered simultaneously. Map 2-10 shows the major drainages and riparian habitats of the area. A list of the species of fish occurring in the ES area is available from the Montrose District Office.

RIVER HABITATS

The eastern portion of the Gunnison River flows through the Gunnison Gorge, which is surrounded by very dry hills and plateaus where all streams except the Smith Fork are intermittent. The recently completed USBR Crystal Dam will inundate a section of the river forming a new reservoir below the existing Morrow Point Reservoir. Below Crystal Dam the river transects the Black Canyon National Monument and BLM's Gunnison Gorge recreation lands.

The section below Crystal Dam is an excellent trout fishery. A creel census conducted in 1974 showed 107 fishermen fished 399 hours to catch 358 fish at a catch per man-hour of 0.90. The catch consisted of 70 percent rainbow and 30 percent brown trout with an average size of 15 inches. A few Kokanee salmon, cutthroat, and mackinaw trout were also taken. (The creel censuses mentioned here and below are the only available source for population figures.)

From the point where it emerges from the gorge to the ES boundary, the Gunnison River receives inflow from perennial streams on the plateau to the south and from intermittent streams in the alkali area to the north. The river carries a large sediment load.

Cold water species dominate the fish fauna above the confluence of the Uncompahgre River, while below the confluence warm water species become more common. The 1974 creel census showed 91 fishermen taking 130 fish at a rate of 0.64 fish per man-hour. The catch consisted of 70 percent rainbow, 18 percent brown trout, 3 percent cutthroat trout, 1 percent northern pike, 4 percent bullhead, and 4 percent sunfish. Several of the fish species listed as endangered historically occupied this river section. One of these fish, the humpback sucker, *Xyrauchen texanus*, has been found recently.

The North Fork of the Gunnison drains an area, the majority of which is NRL, with many perennial streams. These streams have generally good water quality and they support small trout populations. Water quality of the North Fork is influenced heavily by irrigation return flow, coal mining, and sewage. Fishermen take browns and rainbows at a rate of 0.55 fish per man-hour. Bluehead suckers, dace, sculpin, and other suckers dominate the fish fauna.

The Uncompahgre River from the headwaters to Montrose is adversely affected by mine drainage and heavy metals and is very poor as a fishery. High concentrations of heavy metals virtually exclude aquatic life in the uppermost section. Below Ridgway rainbow and brown trout are found but trout account for only 10 percent of the fish numbers. Western white, bluehead, and flannelmouth suckers dominate the fish fauna. Below Montrose the river is largely dewatered by irrigation during the growing season. The fish fauna

from Montrose to Delta is almost entirely suckers. Sediment from irrigation return flow is heavy in this section.

RIPARIAN HABITATS

Riparian habitats consist of those vegetative species which require a water supply from a stream or standing body of water. In the ES area, the majority of riparian habitats occur in the bottom of canyons which have been cut by streams. In some cases, intermittent streams maintain healthy riparian habitats through ground water flow.

Riparian habitats occur as subtypes within each of the major vegetative types. Major overstory species are cottonwood, willow (*Salix* sp.), box elder (*Acer* sp.), wildrose (*Rosa* sp.), and elderberry (*Sambucus melanocarysa*). The understory is made up of giant wild-rye (*Elymus condensatus*), yellow sweet clover (*Melilotus officinalis*), cattail (*Typha* sp.), and horsetail (*Equisetum* sp.).

STREAM HABITATS

Stream habitats within the ES area are limited by the scarcity of water and high demand for water by agricultural users. (See Climate for information on precipitation.) These habitats must withstand large variations in discharge rates (see Water Resources).

Stream fisheries habitat in the area is exemplified by the following typical pattern. Cold water trout habitat begins in the headwaters on NFL and extends for varying distances onto NRL. There it warms gradually and turbidities increase. The stream habitat becomes suitable for dace, chubs, suckers, and other minnows as it approaches the lower limit of NRL.

Stream environments in the area vary greatly. The majority of streams in the area fit into the following descriptive categories.

ALKALI STREAMS. The streams northwest of Delta in the adobe area are small and intermittent. They have high pH, alkalinity, and total dissolved solids. Fish life is lacking, and aquatic species are limited. Tamarisk is a characteristic riparian species.

PLATEAU CANYON STREAMS. The drainages on the Uncompahgre Plateau in the western portion of the ES area occupy deep rocky canyons with wide bottoms. Streams are high in suspended solids and are subject to flash floods. Minnows and suckers are the major fish. The woody riparian species—such as cottonwood, wild rose, and willow—dominate the canyon vegetation.

INTERMITTENT STREAMS. The drainages around the Gunnison Gorge and east and west of the lower Uncompahgre River are in badlands subject to flash floods; the runoff is very high in suspended and total dissolved solids. Aquatic and riparian species are lacking, and range plants are the only vegetation.

NORTH FORK STREAMS. Perennial streams flowing to the North Fork of the Gunnison River have steep, rocky channels and good water quality. Trout, mountain suckers, and a high diversity of aquatic invertebrates are found in the streams. Elderberry, willow, oakbrush, and some conifers make up a healthy riparian community.

ANALYSIS OF PRESENT HABITAT CONDITION

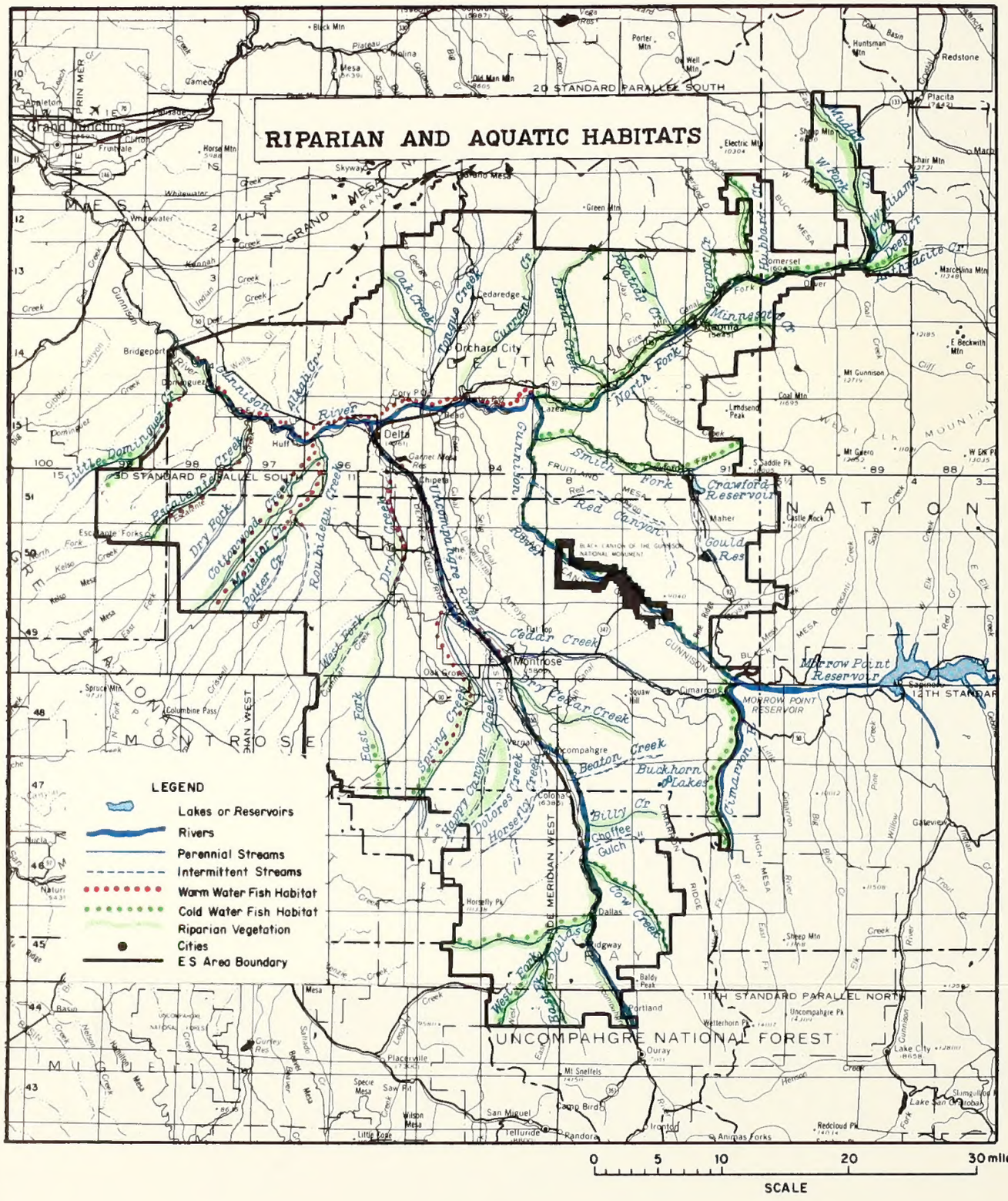
Surveys were made of 496.8 miles (162.8 miles NRL) on 39 streams in the ES area, and a rating was given to both the aquatic habitat and the riparian habitat of each stream (as discussed in footnotes to table 2-27). Table 2-27 summarizes the pertinent information that is currently available on the condition of aquatic, riparian, and fishery stream habitats as they occur within the proposed allotments.

Table 2-28 shows the size of the watershed for each stream and the amount and percentage of the watershed of each stream that is composed of NRL grazing allotments. The total sediment presently yielded to each watershed was calculated from table 2-8 in the water resources section. The last column in the table gives the present average sediment yield per acre (tons per year) for all NRL acres used for grazing within a single watershed. These values were used in the absence of water quality data to make general comparisons between the sediment yield to streams of the ES area.

Cultural Resources

Archeological Resources

The ES area has been continuously occupied by humans for at least the last 10,000 years. This aboriginal occupation of the area is considered to have been Ute during the historic and contact periods. During the prehistoric period the occupation has been defined as the Uncompahgre Complex, which is thought by some authors to be the progenitor of the historic Ute culture.



Map 2-10. Major Drainages and Riparian Habitat

TABLE 2-27
PRESENT STREAM HABITAT CONDITION

Stream Name	Intermitten or Perennial a/	Miles of Stream Habitat a/	Allotment No. & Name	NRL Stream Habitat Miles a/	Riparian Habitat b/	Aquatic Habitat c/	Fishery Habitat d/
Cottonwood	I	16.4	4007 Sawmill Mesa	2.2	Poor	Poor	None
			4008 25 Mesa	12.4	Poor	Poor	None
Little Dominguez	P	14.4	4001 Dominguez	13.0	Fair	Fair	Good for sucker and minnow species
East Fork Escalante	P	10.6	4026 Escalante Canyon	4.6	Fair	Good	Warm water, minnows and suckers
Escalante	P	14.6	4001 Dominguez	12.0	Fair	Good	Warm water, minnows and suckers
Gunnison (Black Canyon to Uncompahgre confluence)	P	30.8	*	15.0	Good	Excellent	Excellent trout fishery
Gunnison (Uncompahgre confluence to area border)	P	22.0	*	10.0	Fair	Good	Habitat for endangered species, warm water fish

a/ USGS quadrant maps.
b/ The riparian community is the habitat of the stream and pond banks and bottoms containing terrestrial plants and animals in need of a near source of continuous water or the organisms that associate with these plants and animals. The riparian communities are classified according to the following system. (1) Excellent: diversity and abundance of typical riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) good; good age distribution, reproduction evident; soil mostly covered with vegetation, bank erosion generally lacking; cover for animals abundant; vegetation shades water most of the day. (2) Good: most groups of typically riparian plants and animals present at or near stream border, but numbers may be reduced; age diversity fair, reproduction evident; some bare soil areas noticeable, but erosion at low levels; riparian animals somewhat reduced or typical species missing due to cover loss; vegetation shades water at least part of the day. (3) Fair: many of the typically riparian plants and animals rare or missing from stream border; age diversity lacking, little sign of reproduction; bare soil may be common; animal populations greatly reduced because of lack of cover and may only be transitory in the community; vegetative shade on stream lacking or only during morning and evening hours. (4) Poor: typically riparian plants and animals scanty or lacking in both numbers and diversity; little age variation, no sign of reproduction; range plants (e.g., rabbitbrush, sagebrush,) abundant down to water edge; erosion of bare soil normally high, but may be reduced in monotypic grass communities which provide good ground cover but little diversity or animal cover; no shade on water from vegetation. (5) Nonexistent: self-explanatory.
c/ The aquatic community is composed of a watery habitat and those organisms that are partially or totally submerged in it for most of their lives. The aquatic communities are classified according to the following system. (1) Excellent: abundant, diverse, and stable community; cover for fish available; pools and riffles supporting optimum production of producers and consumers. (2) Good: community diverse, but below potential; cover available, but somewhat reduced; pools and riffles supporting good numbers of producers and consumers. (3) Fair: community noticeably limited in numbers and diversity; cover limited and limiting animal populations; some fish present, but populations and reproductive potentials reduced by the habitat. (4) Poor: community barely surviving; cover lacking; a few fish may be surviving, but little chance of continued survival; diversity of invertebrates low, but numbers of certain species may be high. (5) Nonexistent: self-explanatory.
d/ Fishery information was taken from DOW's creel census, electroshocking, gill net, and stocking records at the Southwest Regional Office.
* Major rivers may cross many allotments. The effects of specific allotments on major rivers are insignificant when compared with the effects of the overall watershed.

TABLE 2-27
PRESENT STREAM HABITAT CONDITION (Cont.)

Stream Name	Intermitten or Perennial a/	Miles of Stream Habitat a/	Allotment No. & Name	NRL Stream Habitat Miles a/	Riparian Habitat b/	Aquatic Habitat c/	Fishery Habitat d/
Monitor	P	7.8	4010 Monitor Mesa	3.8	Poor	Good	Good for minnows and suckers
			4014 Joker	3.0	Poor	Good	Good for minnows and suckers
Potter	I	6.8	4010 Monitor Mesa	6.8	Nonexistent	Nonexistent	None
Roubideau	I	16.8					
Lower			4011 Lower Roubideau	2.1	Nonexistent	Poor	A few large pools maintain minnows
Upper			4010 Monitor Mesa	4.9	Poor	Fair	Headwater trout
			4012 Canal	2.6	Poor	Fair	Headwater trout
Beaton	I	9.2	5540 Dry Gulch	3.0	Nonexistent	Nonexistent	None
Billy	P	6.4	5530 Billy Creek	0	Excellent	Good	Small fish, trout or minnows
Chaffee	I	4.6	5530 Billy Creek	1.6	Nonexistent	Nonexistent	None
Cow	P	10.2	5566 Cow Creek	0.6	Good	Good	Trout, some fishing available
Dallas	P	12.2	None	0.8	Good	Fair	Some trout
Dolores	I	12.0	5520 Lower Horsefly	3.4	Excellent	None	None
			5522 Beaver Hill	1.2	Excellent	None	None
Dry	P	22.8	5507 Pipeline	3.4	Good	Good	Minnows
			5513 Dry Creek Basin	5.6	Good	Good	Minnows
			5516 Piney	3.0	Good	Good	Trout habitat
Dry Cedar	P	12.6	5520 Lower Horsefly	2.1	Fair	Fair	None
Cedar	P	14.0	5569 Hairpin	2.2	Fair	Fair	None
McKenzie	I	12.0	5529 Log Hill	1.2	Fair	Nonexistent	None
Happy Canyon	I	19.2	5522 Beaver Hill	4.6	Excellent	Nonexistent	None
Spring	P	17.0	5522 Beaver Hill	5.4	Good	Good	Trout in headwaters, minnows below
Uncompahgre	P	60.2	*	1.8	Poor	Fair	Some trout, mostly rough fish
Smith Fork	P	18.6	5022 Rabbit Gulch	2.4	Good	Good	Upper part is trout water

* Major rivers may cross many allotments. The effects of specific allotments on major rivers are insignificant when compared with the effects of the overall watershed.

TABLE 2-27
PRESENT STREAM HABITAT CONDITION (Cont.)

Stream Name	Intermitten or Perennial a/	Miles of Stream Habitat a/	Allotment No. & Name	NRL Stream Habitat Miles a/	Riparian Habitat b/	Aquatic Habitat c/	Fishery Habitat d/
Bear	P	5.2	4517 Coal Gulch	3.0	Fair	Nonexistent	None
Cottonwood	I	2.0	4517 Coal Gulch	1.2	Excellent	Nonexistent	None
Deep	P	2.5	4525 Anthracite Creek	0.6	Fair	Fair	None, too small
North Fork Gunnison	P	32.2	4517 Coal Gulch	4.2	Fair	Good	Good trout fishery, northern pike from Paonia Reservoir
Hubbard	P	4.3	4516 North Fork	1.4	Fair	Good	Three trout species, good fishery
Leroux	P	13.8	4503 Stingley Gulch	0.5	Excellent	Excellent	Two trout species, good fishery
			4504 Leroux	1.0	Excellent	Excellent	Two trout species, good fishery
Minnesota	P	7.2	4528 Oak Ridge	0.5	Excellent	Good	Rainbows have been planted, no fishing pressure
Muddy	P	12.0	4520 Spring Creek	2.6	Fair	Poor	Some trout, poor fishery
West Muddy	P	4.0	4519 Muddy Creek	0.8	Fair	Poor	Some trout, poor fishery
Terror	P	4.0	4513 Stevens Gulch	3.0	Good	Excellent	Rainbows and natives, light fishing pressure
Williams	P	1.6	4525 Anthracite Creek	0.8	Good	Good	None, too small
Roatcap	I	7.8					
West Fork			4507 Jay Creek	1.6	Good	Good	Natives
			4511 Overland	0.4	Good	Good	Natives
East Fork			4513 Stevens Gulch	1.2	Good	Nonexistent	None
Currant	P	14.6	4502 Surface to Leroux	2.2	Good	Good	None
Anthracite	P	5.0	4548 Creek Bottom	0.3	Fair	Excellent	Four trout species, good fishery
Oak	I	9.4	4025 Ward Creek-Doughspoon	2.8	Fair	Nonexistent	None
TOTALS		496.8		162.8	12.4 Excellent 45.4 Good 60.8 Fair 30.7 Poor 13.5 Nonexistent		19.8 Excellent 64.9 Good 28.0 Fair 20.1 Poor 30.0 Nonexistent

TABLE 2-28

COMPOSITION OF WATERSHEDS SUPPORTING AQUATIC AND RIPARIAN HABITAT

Stream Name	Watershed Acres	NRL Acres in Watershed	Percent Of Watershed Made Up by NRL	Total Present Sediment Yield to the Watershed from NRL (ton/year)	Present Average Sediment Yield for NRL Acres in the Watershed (tons/acre/year)
Cottonwood	32,015	19,015	59	32,536	1.71
Little Dominguez	51,720	7,520	15	17,859	2.37
Escalante	121,125	37,285	31	77,100	2.07
Monitor	18,600	6,640	36	10,778	1.62
Potter	13,760	5,560	40	9,912	1.78
Roubideau	87,681	25,815	29	44,734	1.73
Billy	6,320	2,160	34	3,031	1.40
Beaton	10,800	2,840	26	11,052	3.64
Chaffee	3,420	1,860	54	2,669	1.44
Cow	-	Insignificant	-	-	-
Dallas	-	Insignificant	-	-	-
Dolores	9,880	2,800	28	3,902	1.40
Dry	55,161	23,925	42	31,804	1.33
Dry Cedar	8,760	1,840	21	6,253	3.40
Cedar	25,020	2,860	11	7,811	2.73
McKenzie	3,640	880	24	886	1.01
Happy Canyon	12,400	3,360	27	3,532	1.05
Spring	20,640	7,400	36	7,407	1.00
Smith Fork	-	Insignificant	-	-	-
Bear	5,600	1,280	23	1,312	1.03
Cottonwood	1,360	600	44	600	1.00
Deep	1,680	240	14	141	0.59
Hubbard	35,920	1,525	5	2,390	1.57
Leroux	38,440	4,655	12	5,349	1.15
Minnesota	25,440	5,720	22	6,854	1.20
Muddy	-	Insignificant	-	-	-
West Muddy	-	Insignificant	-	-	-
Terror	18,730	2,170	11	1,672	0.77
Williams	2,280	180	8	108	0.60
Roatcap	8,720	3,470	40	2,853	0.82
Currant (upper)	21,810	6,210	28	6,240	1.00
Anthracite	-	Insignificant	-	-	-
Oak	11,600	3,640	31	1,839	0.51

The Uncompahgre Complex has been defined as an archaic level of human adaptation that manifests itself in effective and efficient use by humans of all major ecological zones in the area. The presumed level of human organization is a band level of development involved in a seasonal round of hunting and gathering that was very similar to the life style of contact period Utes.

The physical expressions of these seasonal rounds are the different types of archeological sites and artifacts found today. Archeological sites are confined to five types: lithic sites, rockshelters, wickiup sites, rock art, and dry-laid masonry structures. Lithic debris is found at all sites, and the various types of sites reflect human response and adaptation to environmental changes and fluctuations. Twelve phases have been identified that probably reflect specific types of environmental response. These phases range in date from 8000 B.C. (the paleo-Indian stage) to A.D. 1880 (the end of Ute occupation in the area). The phases are differentiated from one another by specific artifact types which have been dated based on relative and absolute chronology. As an example, wickiups are dated and occur only in the Escalante phase (1500–1880). Various phases also reflect, in certain artifact categories such as pottery and rock art, diffusion of ideas and influences from the Anasazi area to the south and the Fremont culture to the west and north. It is presumed, although definite evidence is lacking, that some culture elements penetrated the area from the Western Great Plains culture area to the east.

Prior to studies for this ES, 186 archeological sites had been located on BLM, private, and National Park Service (NPS) lands within the ES area. Fifty of these sites are rockshelters, 22 are petroglyphs sites or sites with petroglyphs, 5 are wickiup sites, 2 are dry-laid surface structures, 2 are Anglo-historic structures, and the rest are open lithic sites.

Forty of the sites have been tested or excavated by professional archeologists. About 95 percent of the 186 sites have been tampered with by amateurs and vandals, and at least 50 sites have been totally destroyed. Map 2-11 shows archeologically inventoried areas. Appendix 6 provides a summary of the procedures used to identify the archeological sites in the area and identifies (table A-13) the recorded sites and their condition and status.

In addition to the 186 previously known sites, a 1976 University of Colorado (CU) sampling survey has located 118 additional sites. (These sites are listed at the end of table A-13 of appendix 6 and are shown on map 2-11.) The predictive model of site location developed by the CU team suggests that there may be 6,050 sites within the ES area. There are also 152 allotments within the ES area that crosscut probable archeological site locations. Since many allotments contain several of the topographic features used in the CU stratified random design sampling technique, it is impossible to predict accurately the numbers of potential sites by specific allotment. However, the number of potential sites can be suggested for allotments containing topographic situations sampled. Table 2-29 notes the number of predicted sites by percent of the total number of allotments. Since some allotments contain more than a single topographic situation the total percentage will add up to more than 100 percent. Based on the predictive statement and allotment analysis, it is easily seen that all allotments are likely to have some archeological sites located on them.

TABLE 2-29.—*Predicted number (by percent) of potential archeological sites for allotments containing topographic situations sampled*

Topographic situation	Number of sites	Percent of allotments containing situation
Talus slopes	1,733	67
Mesa/terrace/bench tops	2,827	71
Adobe hills	78	38
Canyon rim	1,395	78
Valley bottom	17	82

SOURCE: 1976 University of Colorado sampling survey.

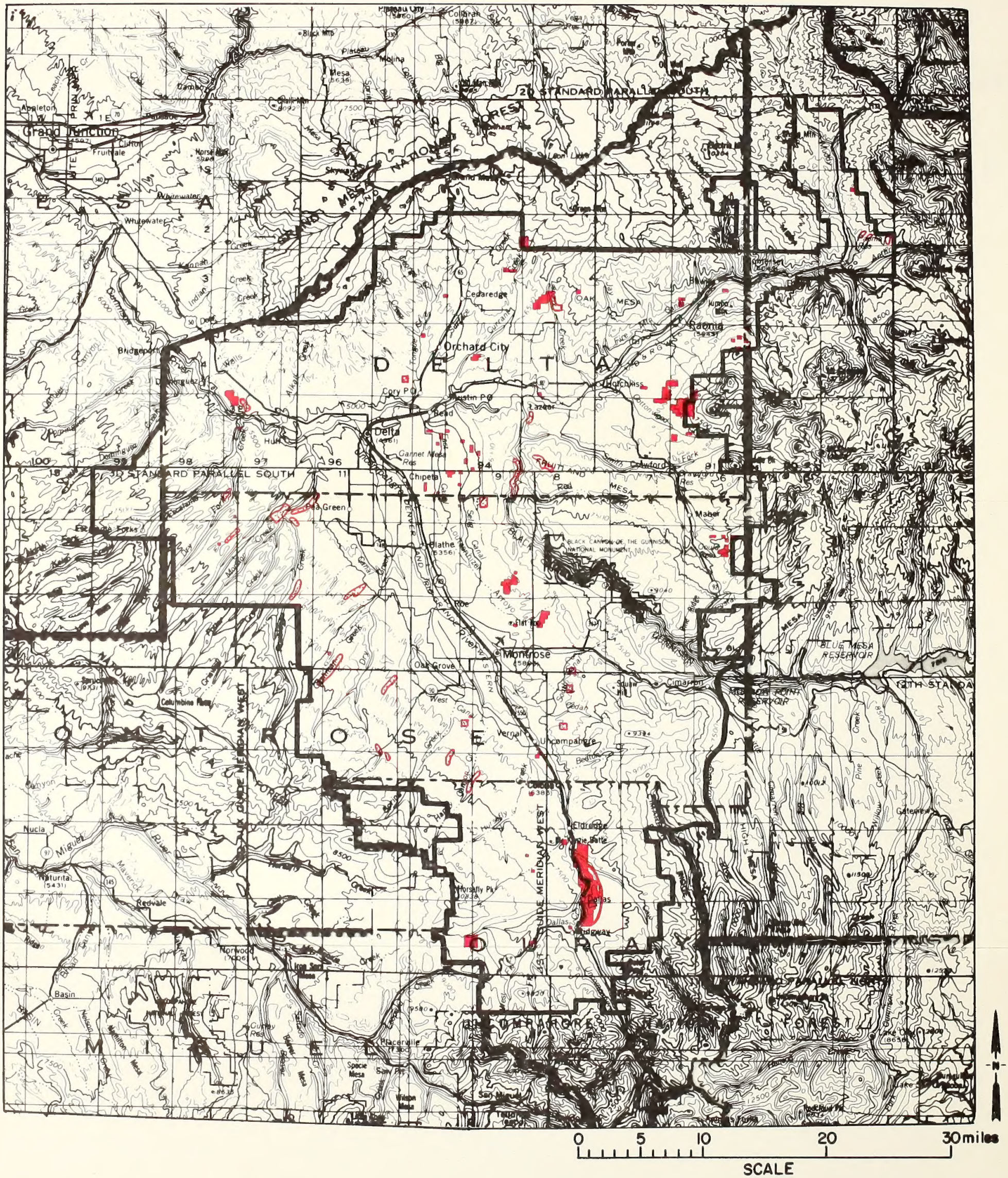
A number of other sites are known to have been recorded by inventories conducted by the U.S. Forest Service (USFS), NPS, and USBR; however, the results of these studies are not currently available.

Of the 186 previously recorded sites, the following 5 are considered significant. They have virtually defined the Uncompahgre Complex, and they have been nominated to the National Register of Historic Places. These sites were excavated by Dr. William Buckles in 1962 and 1963 and became the basis for the definition of the complex. These sites contained particular elements or long time sequences that identified and confirmed the cultural tradition and occupation of the Uncompahgre area.

1. Lee Ranch Wickiup Village 5MN41. A historic Ute site on private land. (See figure 2-3 for a photograph of a standing wickiup.)

Figure 2-3. Standing wickiup on NRL

Figure 2-4. Historic Ute and homesteader petroglyphs



LEGEND

PROJECT INVENTORIED AREAS CLEARED AS A RESULT OF SPECIFIC PROJECTS, SUCH AS CHAININGS, EXCHANGES, ETC.

STATISTICAL INVENTORIED AREAS SAMPLED DURING THE UNIVERSITY OF COLORADO INVENTORY FOR THE ENVIRONMENTAL STATEMENT.

Map 2-11. Archeological Investigations

2. Sandburg Site 5MN43. A rockshelter on BLM lands that has been excavated and has yielded evidence of occupation from 2500 B.C. to A.D. 1 and sporadically around A.D. 700.

3. Moore Site. A rockshelter with petroglyphs which has been excavated and has yielded evidence of occupation between 1500 B.C. and 1000 B.C.

4. Dry Fork Petroglyphs 5DT1. A petroglyph site that contains historic Ute peckings, dating from approximately A.D. 1700 to 1880, and Anglo homesteaders' inscriptions. (See figure 2-4 for a photograph of historic Ute and homesteader petroglyphs.)

5. Christmas Rockshelter 5DT2. A rockshelter which has been excavated and has yielded evidence of occupation by prehistoric aboriginals between 8000 B.C. and A.D. 1300 and then reoccupation by Anglo homesteaders about 1880.

The University of Colorado study identified four additional sites which they consider eligible for the National Register. These sites are all lithic scatters of large size. All of the sites appear to have been intermittently occupied over long periods of time, and they are particularly representative of human occupation and adaptation in the ES area. They are also typical, except in size, of the majority of archeological sites found in the area. It is believed, based on evaluation of the surface remains, that these four sites will aid in expanding the definition of human use and adaptation in the ES area. These sites are:

1. 5MN596. An open lithic scatter approximately 35 by 35 meters in size. The site is in excellent condition and has the potential of yielding significant data on human adaptation in the ES area.

2. 5MN716. An open lithic scatter approximately 175 by 40 meters in size. The site is washed and eroded but has the potential of yielding significant amounts of information.

3. 5MN726. An open lithic scatter approximately 150 by 30 meters. The site is slightly vandalized but has the potential of yielding significant information on the human use of the area.

4. 5DT216. An open lithic scatter approximately 250 by 100 meters. The site is washed but appears to have the potential for yielding significant information about cultural adaptations.

Historical Resources

The first nonaboriginals to visit the area were the Spanish in the eighteenth century, followed in the early nineteenth century by fur traders. The middle of the nineteenth century saw the development of the mining and grazing industries, with the major arrival of settlers and organization of towns occurring in the last quarter of the century. Agriculture livestock production and irrigated farming became the major basis of the economy during this period and has continued so to the present day.

HISTORIC SITES

The physical evidence of European occupation of the ES area consists mainly of roads, rail beds, mines, and buildings. Most of these sites are located on private land, and many are still in use.

The following four historic sites are listed on the National Register of Historic Sites and Places or have been nominated to the National Register: Ute Memorial Site (Montrose County), City and Walsh Library (Ouray County), Belmont Hotel (Ouray County), and D&RGW Railroad Trestle (Montrose County). Appendix 7, table A-14, is an inventory of other historic sites within the ES area, based on a preliminary field survey conducted in June and July, 1976. It identifies the sites, their number, principal feature, integrity, condition, historical significance, size, and ownership or management status. None of these sites would be affected by the proposed action.

Visual Resources

Characteristic Landscape

The Uncompahgre Basin lies within the Colorado Plateau physiographic region. The public lands in this basin lie between the pastoral lowlands and the higher coniferous forests; they are characteristically hills and mesas vegetated mostly with vast stands of pinyon pine and juniper trees, sagebrush, mountain shrubs, and sparse wasteland-type plants. Public lands also lie adjacent to the river canyons of the Gunnison River and its major tributary, the North Fork; however, there are no proposed facilities in these canyons so they are not described any further in this section.

The critical points from which to view the public lands are the towns and paved highways in the valleys. These viewing points and roads are typically flanked by the privately-owned pastoral

lands, so that the near edge of the public lands lies some distance away from 1 to 5 miles in most cases. Thus, only general landscape patterns are perceived, as most detail is lost with such distances. (See figures 2-5 and 2-6.)

The public lands fall into one of two types of landscapes, each differentiated mainly by landform and vegetation: (1) adobe badlands and (2) pinyon-juniper/mountain shrub hills and mesas. These two types are described below.

ADOBE BADLANDS. In the lowest elevations of the public lands, lying mostly north of Montrose and Delta and west of Hotchkiss, are the adobe badlands. They have a sand dune appearance for the most part, although a few areas are mesas. Being relatively devoid of vegetation, they take their colors from exposed soils. These soils are mostly a yellowish cream color, but in places they are streaked with blue and brown. Up close the adobes are bleak, like a moonscape; from a few miles away their forms and lines (skylines and erosion patterns) can create strong and interesting visual patterns, especially with changing light conditons and snow cover (see figure 2-7). The areas around Petrie, Negro, and Doctor mesas, north of Delta, are outstanding among these adobes, exhibiting all the colors mentioned above and towering up to 1,500 feet above the nearby towns and highway.

PINYON-JUNIPER/MOUNTAIN SHRUB HILLS AND MESAS. These hills and mesas, mostly the lower flanks of still higher mesas and mountains, appear to be smooth-surfaced and rise gently away from the pastoral lands on the Uncompahgre Plateau and east side of the Gunnison Uplift (see figures 2-8 and 2-9). The rise is steeper along Grand Mesa, the West Elk Mountains, and Cimarron Ridge. In parts of these latter areas, the toes of the mesas screen the rest of the landforms from view from the valley bottoms. On the northern Uncompahgre Plateau and west side of the Gunnison Uplift, rock outcrops are visible and create parallel lines with the pinyon-juniper. These lines reflect the drainage patterns, ruggedness, and the upsweep of the landforms. These exposed rocks are generally shades of tan and rusty red.

Pinyon-juniper and mountain shrubs cover the soils and rocks almost completely and uniformly. There are no vegetation patterns, except where the vegetation types change as a result of changes in elevation. There is little variation of color, none in the pinyon-juniper, which is dark green all year long. The mountain shrub zone does change with the season: light green and dark green in the spring and summer, a short period of reds and oranges in the fall, and browns and greys in the winter. However, the long viewing distances reduce the magnitude of this variation. Thus, the vegetation is continuous canopy, and therefore textures (fine textures) are dominant.

The significance of this situation is that human-made openings, especially ones that do not look natural, tend to be very obvious. Such openings presently exist in the form of roads; cleared lines for fences, power transmission, and pipelines; and chainings (mostly on the Uncompahgre Plateau). However, the low angles of view (the angle made by the line of sight and rise of landform) and the long viewing distances tend to reduce the visibility and the magnitude of visual contrast of most of these existing changes. This viewing situation reduces the visibility of nearly all of the livestock management facilities which presently exist on public lands, particularly the chainings.

With the apparent featureless land formations, constancy of color, and texture-dominant vegetation, the scenery quality of the public lands is mostly minimal (C), with a few areas of characteristic (B) quality. Outstanding scenic features (A quality) include the adobe formations previously noted; Needle Rock, a massive 800 foot high, truncated volcanic pillar at the base of the West Elk Mountains near Crawford; and a portion of Spring Creek on the Uncompahgre Plateau. The Dominguez Creeks area on the northern part of the Uncompahgre Plateau is to be studied for wildland values (see map 2-13 in Recreation).

The sensitivity area is high (important) for the areas that are visible from the previously noted types of viewing points. Areas which are visible only from some of the minor, locally-used or hunter-used roads have moderate sensitivity levels. Areas with neither high nor moderate sensitivity levels have a low sensitivity level.

Visual Resource Management Classes

Visual Resource Management (VRM) classes have been established for the public lands. The manner in which they were determined is explained in appendix 8. Each VRM class describes a different degree of modification allowed in the basic elements (form, line, color, and texture) of the landscape. The classes are therefore the bases

Figure 2-5. Travelling south along the Uncompahgre River Valley, one's attention is held by the distant San Juan Mountains.

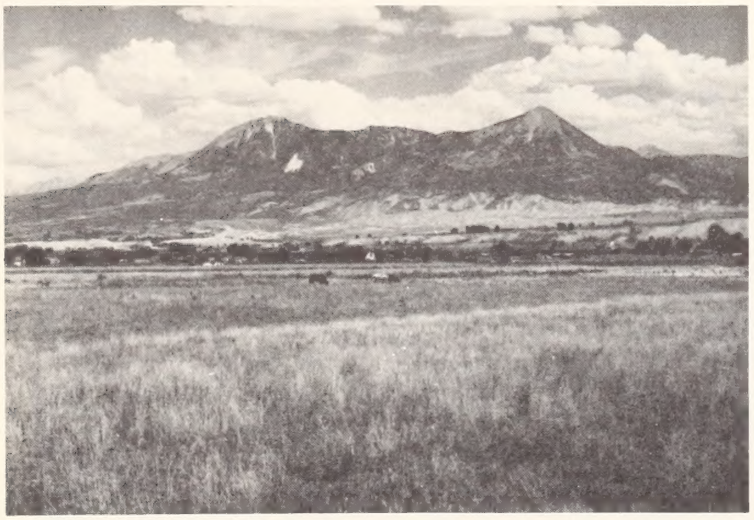


Figure 2-6. Mt. Lamborn (left) and Lands End Peak (right), along with the foreground orchard and ranch lands, hold one's attention in the upper North Fork Valley.

Figure 2-7. The light-colored adobe badlands contrast sharply with the light green croplands and the dark green of Grand Mesa's pinyon-juniper and oakbrush.

Figure 2-8. View of the Uncompahgre Plateau.

Figure 2-9. Roubideau Canyon is a typical example of how deceptively uniform the Uncompahgre Plateau appears from the towns and highways along the Uncompahgre River.

for determining whether or not a modification would result in a visual impact and if so what appropriate mitigating measures would be required. These classes are defined in table 2-30 and the areas they cover are shown in a generalized manner on map 2-12.

The Dominguez Creeks area is given an interim VRM Class II to protect its visual resources until a wildlands inventory is completed.

Recreation

Lying in the heart of the western slope's recreation land, the ES area provides an outlet for almost all recreation interests. The recreation resources on NRL complement major regional attractions, such as Curecanti Recreation Area and the Black Canyon of the Gunnison National Monument. These significant regional attractions support localized, intensified visitor use, while the NRL attract more diversified activities based on dispersed use. Map 2-13 depicts the existing recreation development locations.

A large portion of the dispersed use on NRL can be attributed to the wildlife values within the ES area. Hunting and fishing are important throughout the area. User data for these values are tabulated in tables 2-31, 2-32, 2-33, and 2-34.

Hunting

Data are presented for deer and elk (both rifle and archery hunting), bear, and antelope hunting in table 2-31. (See maps 2-8 and 2-9 for a delineation of the GMU and SGMU reporting areas; note that antelope management units are different from those for other big game species.) User data on small game, waterfowl, furbearers, and varmints are summarized in tables 2-32 and 2-33.

GMU 62 ranks as the state's third highest unit in terms of number of resident deer hunters (3,698) and second in number of nonresident deer hunters (2,719). Montrose and Delta counties rank second and ninth respectively within the state with regard to number of deer hunters per county.

Pheasant hunting attracted the greatest number of hunters in 1974 for both Delta and Montrose counties, followed in order by rabbit, duck, and dove hunting. However, the greatest number of hunter days for both counties was spent on rabbit hunting, followed closely by hunter days for pheasant hunting.

Hunting for prairie dogs attracted the largest number of varmint hunters in the two-county area, followed by coyote hunting. It is interesting to note, however, that the greatest number of varmint hunter days were spent on magpie hunting.

Muskrat trapping attracted the most trappers in the two-county area, followed very closely by coyote, beaver, bobcat, and raccoon. In order, the most trapper days were spent on coyote, bobcat, striped skunk, muskrat, raccoon, and beaver.

Fishing

Fisherman use within the ES area was compiled from the DOW Fishery Questionnaire (1974). See table 2-34.

The data for Gunnison County are somewhat misleading because most of Gunnison County lies outside the ES area (although it does affect recreational use in the ES area). Gunnison County fishing pressure is influenced heavily by Blue Mesa Reservoir. Montrose is the major county in the ES area, and the fishing pressure for Montrose is typical for the area. Delta County is partially within the area but the major fishing area on Grand Mesa is on USFS land. Gunnison and Ouray counties contain the North Fork and the upper Uncompahgre river areas respectively.

Generally fishing pressure is very low in the area. A higher percentage of nonresidents use the area than residents.

Bureau of Land Management

BLM is currently managing several areas within the ES area, primarily for their recreation values.

In 1972 BLM designated the Gunnison Gorge Recreation Lands. Approximately 30,000 acres in size, the area straddles the Gunnison River between the Black Canyon of the Gunnison National Monument and its confluence with the North Fork. Offering the visitor foot or horse access to the river canyon, the BLM manages the area on a low-intensity, dispersed-use basis. Development has been limited to trail access improvement.

Public Law 93-621, January 3, 1975, amends the Wild and Scenic Rivers Act (PL 90-542, 82 Stat 906) to designate segments of certain rivers for possible inclusion in the National Wild and Scenic Rivers system. The river segments included are to be studied and reported on by October 2, 1979. A segment of the Gunnison River, which flows the length of the Gunnison Gorge Recreation Lands, is included in this act and is currently undergoing

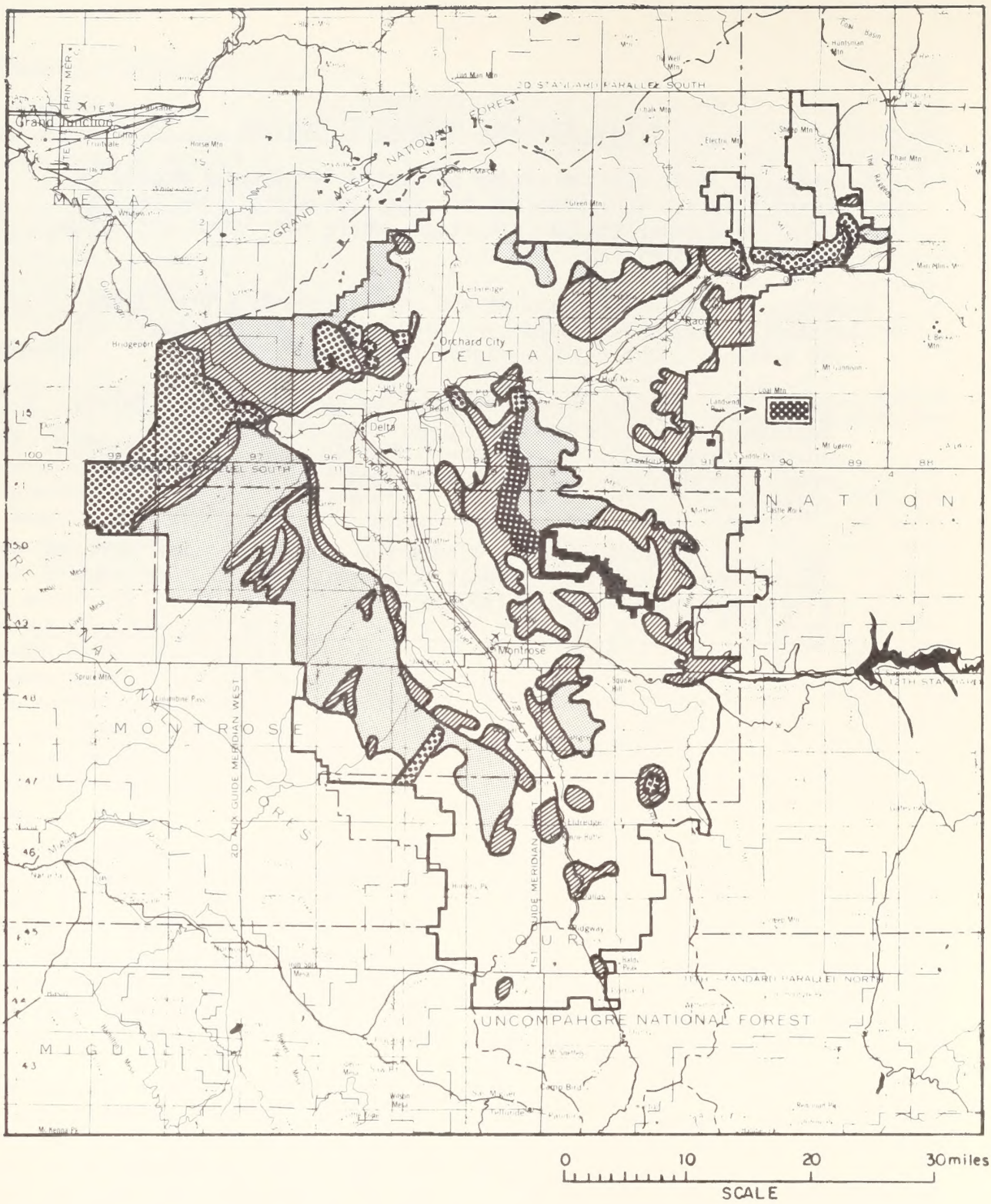
TABLE 2-30
VISUAL RESOURCE MANAGEMENT CLASSES

Class I: This class provides primarily for natural ecological changes only. It is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.

Class II: Changes in any of the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.

Class III: Changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

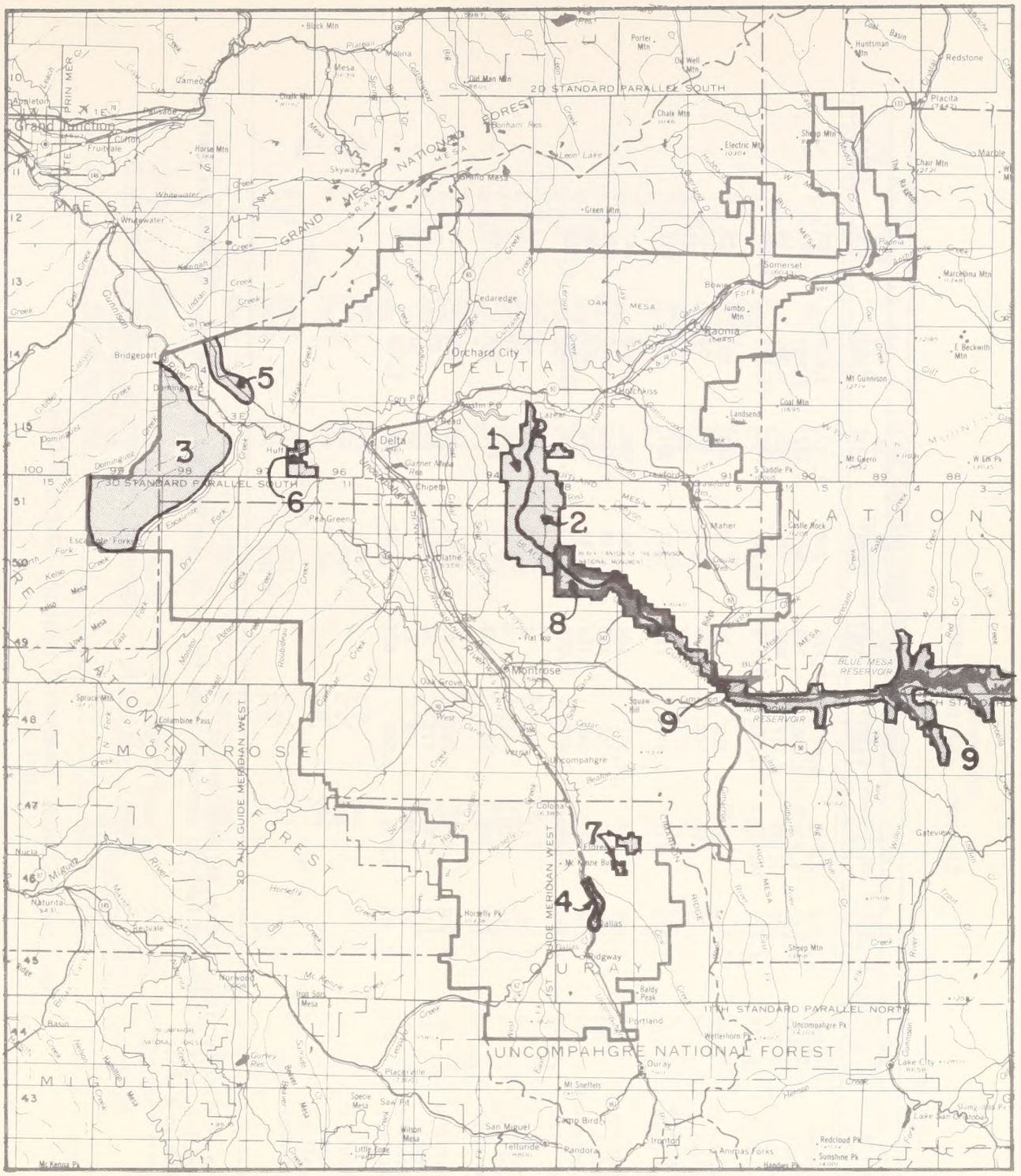
Class IV: Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.



Class I* Class II Class III Class IV

*Needle Rock Natural Area
Gunnison River Wild & Scenic River Study Area (interim)

Map 2-12. Visual Resource Management Classes



LEGEND

1. Gunnison Gorge Recreation Lands (BLM)
2. Gunnison River (BLM-NPS)
3. Dominguez Creek Area (BLM)
4. Dallas Reservoir (Proposed Bu-Rec.)
5. Dominguez Reservoir (Proposed Bu-Rec.)
6. Escalante Wildlife Management Area (D.O.W.)
7. Billy Creek Wildlife Management Area (D.O.W.)
8. Black Canyon of the Gunnison National Monument (N.P.S.)
9. Curecanti Recreation Area (N.P.S.)

Map 2-13. Recreation Resources within the Environmental Statement Area

TABLE 2-31
BIG GAME: USER DATA (1974)

Species Type of Hunt	Measuring Parameters	Game Management Unit (Percent NRL) 52 (13%)	521 (7%)	53 (10%)	62 (40%)	63 (33%)	64 (40%)	65 (74%)	70 (50%)	411 (70%)	82 (80%)
Deer, Regular Season	No. Hunters:	1,536	1,119	2,915	6,417	1,172	774	2,717	3,679	785	-
	Resident	1,181	837	1,726	3,698	740	547	1,752	1,989	641	-
	Nonresident	355	282	1,189	2,717	468	245	965	1,690	144	-
	Hunter-days	5,846	4,114	10,778	25,190	4,015	2,543	9,586	15,382	2,889	-
Deer, Archery	No. Hunters:	37	40	81	322	39	6	143	103	28	-
	Resident	28	20	54	150	26	-	45	59	17	-
	Nonresident	9	20	27	172	13	6	98	44	11	-
	Hunter-days	328	315	531	2,418	275	61	951	832	210	-
Elk, Regular Season	No. Hunters:	1,105	1,876	1,245	1,311	444	164	1,996	2,018	441	-
	Resident	868	1,280	672	768	329	118	1,310	1,056	355	-
	Nonresident	237	596	573	543	115	46	686	962	86	-
	Hunter-days	5,194	8,593	6,498	7,428	2,018	813	10,148	10,263	2,158	-
Elk, Archery	No. Hunters:	11	31	33	54	8	8	65	45	4	-
	Nonresident	-	15	15	41	5	5	38	10	2	-
	Hunter-days	106	213	220	553	159	47	410	559	59	-
Bear	No. Hunters:	52	209	279	326	89	18	146	158	15	-
	Resident	27	134	141	172	62	13	91	67	10	-
	Nonresident	25	75	138	154	27	5	55	91	5	-
	Hunter-days	418	2,914	1,894	2,502	624	90	1,329	1,165	114	-
Antelope	No. Hunters:	-	-	-	-	-	-	-	-	-	30
	Resident	-	-	-	-	-	-	-	-	-	30
	Nonresident	-	-	-	-	-	-	-	-	-	-
	Hunter-days	-	-	-	-	-	-	-	-	-	55

Source: Colorado Division of Wildlife, 1974 Colorado Big Game Harvest.
Note: The measuring parameters, such as number of hunters, represent usage for all of each GMU, not just the NRL. No data are available for NRL apart from the GMUs as a whole.

TABLE 2-32
SMALL GAME, WATERFOWL, FURBEARERS, VARMINTS: USER DATA (1974)

Animal	Delta County 28 Percent NRL				Montrose County 45 Percent NRL			
	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/
Ducks	609	1.5	-	-	678	1.7	-	-
Geese	CLOSED		CLOSED		CLOSED		CLOSED	
Dove	442	1.0	1,642	0.8	576	1.4	2,423	1.2
Turkey	4	-	-	-	15	-	-	-
Pheasant	2,937	4.9	9,358	5.4	1,500	2.5	6,461	3.7
Gambel's Quail	160	15.6	375	12.1	353	34.5	1,167	37.8
Partridge	NO DATA		NO DATA		NO DATA		NO DATA	
Blue Grouse	127	0.8	407	0.9	707	4.5	2,952	6.3
Rabbits	1,135	2.2	7,889	2.7	1,459	2.8	8,413	2.8
Hare	128	1.5	128	0.3	95	1.2	164	0.5
Pine Squirrels	-	-	-	-	97	3.6	192	2.1
Varmints & Furbearers								
Gray Fox	31	3.6	31	0.4	30	8.3	122	1.5
Coyote	268	1.1	915	0.4	543	2.2	5,973	2.8
Marmot	65	1.9	197	0.9	64	1.8	402	1.8
Porcupine	145	3.3	471	2.0	256	5.8	2,558	10.9
Raccoon	33	1.6	1,430	6.0	129	6.4	1,105	4.7
Prairie Dogs	535	4.8	2,000	1.5	673	6.1	8,862	6.9
Jack Rabbits	226	1.1	1,223	0.8	225	1.1	1,377	0.9
Magpie	47	0.5	3,122	2.2	223	2.5	19,912	14.0
Crow	-	-	-	-	231	9.2	1,610	7.8
Badger	-	-	-	-	33	1.7	33	0.2
Bobcat	-	-	-	-	126	4.3	218	0.8
Trapping:								
Badger	4	1.7	17	1.9	11	4.8	41	4.7
Beaver	23	4.5	435	2.9	23	4.5	1,090	7.2
Bobcat	11	2.6	225	1.0	31	7.3	2,334	10.5
Ring-tailed Cat	-	-	-	-	1	4.8	173	19.5
Coyote	16	2.2	489	1.5	33	4.7	2,512	7.8
Gray Fox	16	12.0	551	7.2	7	5.3	596	7.8
Red Fox	-	0.7	-	-	2	0.9	6	0.1
Marten	2	5.4	2	0.1	-	-	-	-
Mink	4	15.1	177	7.0	2	3.3	87	3.4

Source: Colorado Division of Wildlife, 1974 Colorado Small Game, Furbearer, Varmint Harvest.
Note: The figures indicate total usage for all of each county, not just the NRL. No data are available for NRL apart from the counties as a whole.
a/ Percent of State of Colorado total.

TABLE 2-32
SMALL GAME, WATERFOWL, FURBEARERS, VARMINTS: USER DATA (1974) (cont.)

Animal	Delta County 28 Percent NRL				Montrose County 45 Percent NRL			
	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/
Trapping: (cont.)								
Muskrat	34	4.9	959	4.5	27	3.9	955	4.4
Raccoon	26	6.1	1,073	6.6	15	3.5	610	3.8
Striped Skunk	15	5.1	995	8.1	10	3.5	696	5.7
Weasel	2	13.3	115	16.0	-	-	-	-

Animal	Gunnison County 18 Percent NRL				Ouray County 11 Percent NRL			
	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/
Ducks	495	1.2	-	-	-	-	-	-
Geese	-	-	-	-	-	-	-	-
Dove	295	0.7	1,147	0.6	33	0.1	229	0.1
Turkey	2	-	-	-	5	-	-	-
Pheasant	32	0.1	32	-	-	-	-	-
Gambel's Quail	-	-	-	-	33	3.2	33	1.1
Partridge	NO DATA		NO DATA		NO DATA		NO DATA	
Blue Grouse	1,119	7.0	3,962	8.4	NO DATA		NO DATA	
Rabbits	948	1.8	6,710	2.3	129	0.2	579	0.2
Hare	193	2.3	1,393	3.7	96	1.1	251	0.7
Pine Squirrels	65	2.4	491	5.5	NO DATA		NO DATA	
Varmints & Furbearers:								
Gray Fox	NO DATA		NO DATA		NO DATA		NO DATA	
Coyote	626	2.6	8,621	4.1	33	0.1	949	1.4
Marmot	320	9.2	1,018	4.5	NO DATA		NO DATA	
Porcupine	362	8.3	1,594	6.8	33	0.8	65	0.3
Raccoon	NO DATA		NO DATA		NO DATA		NO DATA	
Prairie Dog	339	3.1	1,379	1.1	33	0.3	197	0.2
Jack Rabbits	468	2.3	2,215	2.2	NO DATA		NO DATA	
Magpie	145	1.6	7,380	5.2	33	0.4	197	0.1
Crow	129	4.2	1,207	5.8	NO DATA		NO DATA	
Badger	64	3.3	155	1.0	NO DATA		NO DATA	
Bobcat	61	2.1	2,257	8.7	NO DATA		NO DATA	
Trapping:								
Badger	NO DATA		NO DATA		NO DATA		NO DATA	
Beaver	10	2.0	174	1.1	NO DATA		NO DATA	
Bobcat	6	1.4	426	1.9	4	0.9	60	0.3

TABLE 2-32
SMALL GAME, WATERFOWL, FURBEARERS, VARMINTS: USER DATA (1974) (cont.)

Animal	Gunnison County 18 Percent NRL				Ouray County 11 Percent NRL			
	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/	Number of Hunters	Percent of Total a/	Number of Days	Percent of Total a/
Trapping: (cont.)								
Ring-tailed Cat	NO DATA		NO DATA		NO DATA		NO DATA	
Coyote	17	2.4	627	2.0	4	2.6	66	0.2
Gray Fox	NO DATA		NO DATA		NO DATA		NO DATA	
Red Fox	2	0.9	58	0.9	NO DATA		NO DATA	
Marten	2	5.4	57	4.2	NO DATA		NO DATA	
Mink	5	8.4	245	9.7	NO DATA		NO DATA	
Muskrat	17	2.5	444	2.1	NO DATA		NO DATA	
Raccoon	NO DATA		NO DATA		NO DATA		NO DATA	
Striped Skunk	4	1.4	183	1.5	2	0.7	40	0.3
Weasel	4	26.8	154	21.3	NO DATA		NO DATA	

TABLE 2-33
SMALL GAME, WATERFOWL, FURBEARERS, VARMINTS: SUMMARY OF HUNTERS AND HUNTER DAYS

Animals	Number of Hunters	Number of Days	Animals	Number of Hunters	Number of Days
Ducks	1,782	-	Varmints & Furbearers (cont.)		
Geese	-	-	Magpie	448	30,611
Dove	1,346	5,441	Crow	360	2,817
Turkey	26	-	Badger	97	188
Pheasant	4,469	15,851	Bobcat	187	2,475
Gambel's Quail	546	1,575	Trapping		
Partridge	-	-	Badger	15	58
Blue Grouse	1,953	7,321	Beaver	56	1,699
Rabbits	3,871	23,591	Bobcat	52	3,045
Hare	512	1,936	Ring-tailed Cat	1	173
Pine Squirrels	162	683	Coyote	70	3,694
Varmints & Furbearers			Gray Fox	23	1,147
Gray Fox	61	153	Red Fox	4	64
Coyote	1,470	16,458	Marten	4	59
Marmot	449	1,617	Mink	11	509
Porcupine	796	4,688	Muskrat	78	2,358
Raccoon	162	2,535	Raccoon	41	1,683
Prairie Dog	1,580	12,438	Striped Skunk	31	1,914
Jack Rabbits	919	4,815	Weasel	6	296

TABLE 2-34
FISHING: USER DATA (1974)

User Data	Gunnison	Delta	Montrose	Ouray
Percent NRL	18.00	28.00	45.00	11.00
Man-days of Fishing	589,138	164,512	47,074	19,880
Percent of Total State Use in the County	7.21	2.03	0.58	0.24
Percent of Total State Resident Use in the County	6.03	2.02	0.56	0.18
Percent of Total Non-resident Use in the County	13.70	2.03	0.67	0.55
Relative Rank of Fisherman Use Out of 63 Colorado Counties	2nd	23rd	43rd	50th

Note: The figures indicate total usage for all of each county, not just the NRL. No data are available for NRL apart from the counties as a whole. Total fishing pressure in Colorado in 1974 was 8,127,014 man-days.

study for possible inclusion into the system. The entire study segment runs from the easternmost boundary of the Black Canyon of the Gunnison National Monument to the confluence of the Gunnison and North Fork of the Gunnison rivers.

The wilderness inventory, in accordance with Sec. 603 (a) of the Federal Land Policy and Management Act (FLPMA), has not been completed on the public lands that would be impacted by the proposal. Prior to implementation of any actions, the areas will have to be inventoried and impacts on potential or existing wilderness areas assessed.

Until Congress acts on an area that has been

designated for wilderness study, existing multiple-use activities, including grazing and supporting activities, will continue. New uses or expanded existing uses will be allowed if the impacts will not impair the suitability of the area for wilderness.

Portions of the following units lie within or adjacent to the Gunnison Gorge Recreation Lands and its associated river study segment: 4022 Petrie Mesa, 4516 North Fork, 5002 Dedication Site, 5003 Selig Canal, 5008 Brush Point, 5017 Green Mountain, 5020 Black Ridge, 5022 Rabbit Gulch, and unallotted parcel 24.

In 1970, BLM's management framework plan (MFP) recognized primitive values in the Dominguez Creeks area, about 21,000 acres of land located between Dominguez and Escalante Creeks and bordered on the east by the Gunnison River. The Colorado University Wilderness Workshop of the Colorado Open Space Council further studied the area and recommended expansion to the north. The Grand Junction District Office of BLM recently (1976) completed the unit resource analysis (URA) on their Whitewater planning unit (immediately north of the Escalante planning unit in the Montrose District). The URA concurred in recognizing primitive values associated with the Dominguez Creeks area. Allotment 4001 Dominguez occupies part of the subject area.

In addition to the Dominguez Creeks area, the Roubideau drainage (near Camel Back) constitutes a roadless tract containing at least 5,000 acres. The area appears to meet the preliminary criteria (subject to finalization) used to determine wilderness character. The Camel Back area is adjacent to a Forest Service roadless area identified in their most recent Roadless Area Review and Evaluation (RARE II). Allotment 4010 Monitor Mesa is in the subject area.

Colorado Division of Wildlife

The Escalante Wildlife Management Area is managed by DOW and provides numerous opportunities for local wildlife enthusiasts, most notably waterfowl hunting. No developments exist.

The Billy Creek management area was created primarily to provide for big game winter range habitat. The DOW has constructed gravel road pull-offs to provide better access for visitors. Hunting (in season) and wildlife viewing and photography are the primary recreation attractions. The local archery club maintains a field range at Billy Creek.

BLM allotments 5530 Billy Creek and 5532 Burro Ridge lie adjacent to the Billy Creek management area. When this game management area was established, several acres of NRL were taken out of livestock use.

Agriculture

Farming

Commercial farming is the most important industry in the ES area, contributing a greater amount of income to the area than livestock production. It accounted for $28,870,950 of income in 1973. (Colorado Department of Agriculture 1975)

Table 2-35 shows acreages and cash values of cultivated crops grown in the ES area. Although hay is the main crop grown by acreage and cash value, much of the value of the hay is noncash. Fruit is the most important cash crop in the ES area but is subject to large yearly fluctuations in production. Sugar beets, dry beans, and barley are the next most important cash crops; however, most of the dry beans are grown in western Montrose County outside the ES area. (Colorado Department of Agriculture 1975)

Crop production is confined to the more level portions of the ES area, which are generally in the valley floors. With an average annual precipitation of 8.5 inches for most of the cropland, natural snow and rainfall are inadequate for dryland farming. Crops grown in the area are irrigated by surface water from local runoff, the Gunnison and Uncompahgre rivers, and their tributaries. The water is diverted from streams (some water is stored in reservoirs) and applied to fields mainly by gravity flow systems.

TABLE 2-35.—*Principal crop acreage and cash value (1974)*

Crop	Acres planted	Dollar value
Winter wheat	1,800	321,000
Spring wheat	1,000	171,500
Corn for grain	15,800	1,771,000
Corn for silage	8,700	2,208,000
Barley	16,500	2,215,400
Dry beans	4,800	2,274,400
Sugar beets	3,800	2,470,000
Oats	6,200	221,500
All hay	65,300	6,636,600
Other crops [1]	[2]6,930	[3]10,581,550
Total	130,830	28,870,950

[1]Includes potatoes, onions, other vegetables, and fruit.
[2]1969 fruit acreage only; vegetable crop acreages not available.
[3]Of this figure, approximately $5,061,000 (1969) is attributed to fruit.
NOTE: Montrose, Delta, and Ouray counties were chosen as representing the ES area.

Livestock Grazing

According to a 1974 agricultural census, there were an estimated 108,900 beef cattle and calves in the ES area. This figure represents an increase of 8 percent over the number in 1969 (1969 agricultural census). Prior to that time, the number of beef cattle and calves in Montrose and Delta Counties had remained constant, while it had decreased 10 percent in Ouray County (1964 and 1969 agricultural censuses). (Colorado Department of Agriculture 1975)

On the other hand, the 1974 data indicate approximately 85,000 stock sheep and lambs, the lowest number since such data were first collected in 1920. These data document a continuing reduction in sheep numbers in the ES area. From 1964 to 1969, the number of stock sheep and lambs decreased by 10 percent, and from 1969 to 1974, the number decreased 20 percent. It is expected that sheep numbers will continue to decline at a reduced rate. (Colorado Department of Agriculture 1975)

Nevertheless, the overall number of animal units of livestock is increasing in the ES area because the beef cattle inventory has expanded more rapidly than the sheep inventory has decreased. (One animal unit equals one cow, one cow and calf, or five sheep.) The 1974 inventories indicate a total of 193,900 beef cattle and calves and stock sheep, or 125,900 range livestock animal units. Thus, the 1974 animal unit inventory requires 1,510,800 AUMs of forage and supplements annually, which may approach the existing carrying capacity of the range resource in the ES area. (Colorado Department of Agriculture 1975)

Many of these same trends apply to grazing use on NRL. Many operators using NRL have converted from sheep to cattle in the past ten years. However, the rate of increase for cattle does not approach that for the ES area as a whole. Much of the accelerated increase in cattle numbers for the area must be attributed to private ranches with no NRL permits.

Moreover, it is doubtful if NRL are a major source of livestock forage for the ES area as a whole. In 1976 NRL provided some livestock forage to 146 operators, or about 10 percent of the range livestock operations in the area. BLM records indicate total active qualifications to be 40,705 AUMs annually, while 1975 active licensed use (not including nonuse applied for) was 35,369 AUMs and licensed use (including nonuse) was 39,426 AUMs (BLM, Range Automated Data Processing System). Qualifications are the maximum NRL grazing privileges (AUMs) attached to an operator's private land. The active licensed use indicates the approximate amount of livestock forage actually being used from NRL in the area. Thus, with about 35,000 AUMs of forage, NRL contribute 2.3 percent of the ES area's total annual forage requirement. (Table 2-36 shows present active licensed use, season of use, and active use qualifications in AUMs for each allotment.)

It should be noted, however, that dependency on NRL may be critical for the 10 percent of the ES area's livestock operators who do use NRL forage. This includes many operators who use NRL for short periods in an annual rotation between grazing on private lands in the winter and NFL in the summer.

Land Use Planning, Controls, and Constraints

Ranchers had free and unlimited use of unreserved, unappropriated public lands until the Taylor Grazing Act was enacted in 1934. The primary purpose of this act was "to stop injury to the public grazing lands by preventing overgrazing and soil deterioration, to provide for their orderly use, improvement, and development, to stabilize the livestock industry dependent upon the public range, and for other purposes." In addition, the act states that tenure to public lands cannot be acquired through preemptive means before the land is classified for the intended purpose by the Secretary of the Interior. The lands remain open, however, for the staking of mining claims and for public hunting, fishing, camping, and other outdoor recreation.

Congress enacted the Classification and Multiple Use Act (Public Law 88-607), September 19, 1964. The act authorized and directed the Secretary of the Interior to classify NRL for disposal or for retention for management under principles of multiple use and to produce a sustained yield of products and services. (These classification orders are on file in the Montrose District Office and are numbered C-11562, C-2285, C-3656, C-2286, and C-2287.)

The Federal Land Policy Management Act of 1976 in Section 202 provides for land use planning. Section 202(a) reads as follows: "The Secretary shall, with public involvement and con-

TABLE 2-36
PRESENT ACTIVE LICENSED USE (in AUMs), ACTIVE USE QUALIFICATION (in AUMs), AND PRESENT SEASON OF USE BY ALLOTMENT

Allotment Number & Name	Present Active Licensed Use (AUMs)	Active Use Qualifications (AUMs) a/	Present Season of Use
4001 Dominguez*	1,833	4,800	10/16-05/30
4002 Lower Escalante	300	300	01/09-01/30
4005 Fall Cabin	18	18	05/11-05/31 10/16-10/31
4006 Dry Mesa*	883	876	12/01-12/31 05/08-05/31 11/01-12/31
4007 Sawmill Mesa*	536	600	05/01-05/31 10/16-12/15
4008 25 Mesa	644	644	05/06-05/20
4010 Monitor Mesa	1,174	1,173	05/16-05/31 10/16-11/30
4011 Lower Roubideau Canyon	89	35	10/06-10/21
4012 Canal	831	822	05/15-07/31 10/16-11/15
4013 Ben Lowe	446	432	05/21-05/31 10/16-11/30
4014 Joker	87	87	05/21-10/31
4015 White Ranch	10	10	04/01-05/31 10/16-02/28
4016 Wells Gulch	2,380	2,366	11/15-04/30
4017 Alkali Flats*	2,651	3,061	03/01-02/28 10/15-10/30
4021 Point Creek	0	101	03/15-05/20
4022 Petrie Mesa	1,258	1,263	12/01-04/30
4024 Dirty George	236	243	05/16-06/15 10/16-11/15
4025 Ward Creek-Doughspoon	441	445	05/01-06/15 10/15-11/15
4026 Escalante Canyon	20	20	01/01-02/07
4501 Milk Creek	16	16	05/15-05/31
4502 Surface to Leroux Creek	443	418	05/19-06/15 10/16-10/21
4503 Stingley Gulch	98	98	05/10-06/09
4504 Leroux Creek	249	250	05/15-08/31
4505 Juniper Knob	None	4	
4506 Oak Mesa	64	68	01/11-02/10 05/01-06/15 06/16-09/15
4507 Jay Creek	879	1,034	05/16-10/30
4509 Upper Jay Creek	94	66	05/20-09/30
4511 Overland	29	28	06/01-06/15 10/15-10/30
4512 East Roatcap	68	10	06/19-10/12
4513 Stevens Gulch	694	720	05/01-06/30
4514 Upper Terror Creek	17	16	09/15-10/15
4515 Freeman Gulch	53	53	06/01-10/31
4516 North Fork	1,079	1,860	11/05-07/19
4517 Coal Gulch*	484	568	05/01-08/05 10/23-11/13
4518 Pilot Creek	38	33	06/16-07/30 10/11-11/12
4519 Muddy Creek	16	16	05/16-06/25
4520 Spring Creek	26	26	06/11-06/15 10/06-10/20
4521 Stock Driveway	6	5	06/16-07/30 10/20-11/12
4522 Downing	22	27	05/26-06/17 09/16-09/30

a/ Qualifications are the maximum NRL grazing privileges (AUMs) attached to an operator's private land.
* Annual license includes nonuse applied for in addition to use shown.

TABLE 2-36
PRESENT ACTIVE LICENSED USE (in AUMs), ACTIVE USE QUALIFICATION (in AUMs), AND PRESENT SEASON OF USE BY ALLOTMENT (Cont.)

Allotment Number & Name	Present Active Licensed Use (AUMs)	Active Use Qualifications (AUMs) a/	Present Season of Use
4523 Williams Creek	8	8	05/16-07/15
4524 Deep Creek	3	4	06/01-10/15
4525 Anthracite Creek	118	117	06/04-09/15
4526 Crystal Creek	51	50	05/16-09/30
4527 Jumbo Mountain	413	575	05/11-06/15
4528 Oak Ridge	210	244	05/21-06/15
4529 Reynolds Creek	158	159	06/11-06/20 10/06-10/07
4530 McDonald Mesa*	100	122	06/01-06/20
4531 Popp Ranch	8	4	05/15-06/14 11/15-12/25
4532 McDonald Ranch*	536	546	03/01-05/31 10/01-02/28
4535 Home Place	15	15	03/21-05/08 10/07-10/15
4536 West Young's Peak	6	6	05/01-07/31
4537 Young's Peak	171	175	05/15-07/14 09/01-09/30
4538 Missouri Flats	4	4	06/12-09/15
4539 Cottonwood Creek	10	10	05/20-06/03 09/15-09/29
4540 North Saddle Peak	31	34	06/01-08/31
4541 Sunshine Mesa	5	5	05/15-09/14
4543 South Saddle Peak	13	13	06/16-06/20 10/10-10/15
4548 Creek Bottom	5	5	06/01-10/15
4549 Dry Creek*	135	183	05/12-06/15 10/16-10/20
5002 Dedication Site	213	44	03/01-04/30
5003 Selig Canal*	330	554	05/16-05/25 10/01-10/10 12/15-02/16
5008 Brush Point	1,123	1,153	11/14-05/06
5010 Dead Horse	171	170	05/11-10/25
5011 Gould Reservoir	305	305	05/05-06/30
5012 Cedar Point	55	55	05/10-07/09
5013 Iron Canyon	95	95	05/06-06/30
5014 Poison Spring	99	99	05/01-06/30
5015 Grizzly Gulch	349	345	05/11-08/12
5016 Black Canyon	82	79	05/11-06/30
5017 Green Mountain*	1,647	1,660	05/03-11/25
5020 Black Ridge	400	400	11/16-01/15
5022 Rabbit Gulch	35	35	11/10-12/14
5025 Fruitland Mesa	2	2	05/01-11/30
5026 Star Nelson Airport	11	11	01/02-02/28
5027 Adobe	24	24	05/01-05/30
5028 Doug Creek	60	60	05/01-06/15
5029 Spring Gulch	110	111	06/01-09/20
5030 Bostwick Park	188	188	04/16-10/31
5033 Pinyon Springs	132	131	05/16-10/31
5036 Big Gulch	5	6	04/01-04/30
5037 Black Mesa	6	8	07/01-07/20
5038 Red Canyon	3	2	05/10-10/30
5039 Onion Valley	17	17	07/01-09/05
5040 Pine Ridge	14	14	06/01-11/15
5041 East Gould Reservoir	20	20	06/06-06/15
5043 Collins	10	10	05/05-06/04
5044 Big Pasture	15	15	05/16-06/15
5045 Black Bullet	3	3	11/01-12/18
5046 Big Gulch*	0	39	04/16-05/23
5047 Mesa Creek*	23	55	06/01-10/15

* Annual license includes nonuse applied for in addition to use shown.

TABLE 2-36
PRESENT ACTIVE LICENSED USE (in AUMs), ACTIVE USE QUALIFICATION (in AUMs), AND PRESENT SEASON OF USE BY ALLOTMENT (Cont.)

Allotment Number & Name	Present Active Licensed Use (AUMs)	Active Use Qualifications (AUMs) a/	Present Season of Use
5048 Morrow Point	8	8	05/20-06/10
5049 Smith Fork	19	19	05/01-06/10 11/06-11/15
5050 Allen Reservoir	23	39	05/16-06/04 10/15-10/22
5502 Sandy Wash	707	707	12/01-03/16
5503 Green	39	39	05/25-06/19
5504 Roatcap	264	264	02/17-03/21
5505 Transfer	214	214	10/16-11/16
5507 Pipeline	1,715	1,973	11/11-11/26 12/07-06/09
5508 Government Springs	125	125	05/16-06/15 10/16-11/15
5509 Coal Creek	44	44	03/01-05/26 11/10-01/25
5510 Bald Hills	21	21	05/29-06/30 10/11-11/09
5511 Shavano Mesa	261	260	12/20-02/06
5512 Franklin Mesa*	363	447	12/16-02/26
5513 Dry Creek Basin*	440	540	12/11-02/16
5514 East Fork Dry Creek	11	11	06/01-10/27
5515 Olathe Reservoir	18	17	05/16-10/15
5516 Piney	557	557	06/01-10/31
5517 Spring Creek Canyon	52	59	05/31-10/15
5518 Dave Wood	176	178	04/15-05/06
5520 Lower Horsefly	665	667	12/01-02/15 03/01-05/15
5521 Highway 90	265	313	04/02-06/07
5522 Beaver Hill	1,022	1,026	05/16-06/30 10/01-10/20 12/08-12/28
5523 Horsefly	38	37	05/11-07/02 09/12-10/14
5524 Duckett Draw	20	5	03/18-05/30 11/01-12/31
5525 Dry Creek	15	17	03/01-05/20 12/01-02/28
5529 Log Hill	189	189	05/16-06/13 10/16-10/31
5530 Billy Creek	150	150	05/01-07/01 08/20-09/15
5532 Burro Ridge	15	15	05/01-06/15
5533 Onion Lakes	15	15	10/16-11/30
5534 Shin Park	251	256	11/30-01/16
5535 Cedar Creek	6	6	06/01-06/30
5536 South Canal	60	57	01/01-01/18
5538 Rock Ditch	9	9	11/01-11/30
5540 Dry Gulch	808	797	03/01-06/24 12/28-02/28
5542 Bosgal	9	9	03/01-04/30 12/01-02/28
5543 Waugh	30	40	12/16-02/28
5544 Kelly	2	4	11/01-12/15
5545 Henshaw	12	12	01/10-01/20
5546 Waterdog Basin	35	34	03/20-10/30
5547 Slagle Pass	30	30	07/28-09/27
5548 Washboard Rock	34	34	05/16-09/15
5549 High Park	61	61	07/01-09/30
5551 Dexter Creek	3	3	06/01-06/21
5552 Dallas	24	24	09/01-10/01
5553 Fisher Creek	34	34	05/01-05/31
5555 Taylor Draw	55	55	05/01-05/30

* Annual license includes nonuse applied for in addition to use shown.

TABLE 2-36
PRESENT ACTIVE LICENSED USE (in AUMs), ACTIVE USE QUALIFICATION (in AUMs), AND PRESENT SEASON OF USE BY ALLOTMENT (Cont.)

Allotment Number & Name	Present Active Licensed Use (AUMs)	Active Use Qualifications (AUMs) a/	Present Season of Use
5556 Burro Creek	15	15	03/01-05/15 10/15-02/28
5557 Alkali	20	20	12/15-02/28
5559 South Fork	12	12	05/01-05/31
5560 Cookie Tree	57	55	07/20-10/04
5561 East Fork	14	14	06/15-07/31 10/01-10/31
5562 Hillside	40	20	06/01-09/30
5563 Moonshine Park	7	7	07/01-09/30
5564 Gravel Pit	4	4	10/01-12/15
5565 Tommy Creek	18	18	05/05-06/13 12/15-02/28
5566 Cow Creek	70	80	06/20-07/10
5567 Busted Boiler	2	2	08/01-09/30
5568 Baldy	88	88	06/01-09/30
5569 Hairpin	18	18	05/16-05/30 10/01-10/10
5570 Cedar	315	315	05/01-06/30
5572 McKenzie Creek	5	5	05/01-10/31
5574 Tappan Creek	11	12	04/11-05/10 11/15-11/19
TOTALS	35,369	40,705	

sistent with the terms and conditions of this Act, develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands. Land use plans shall be developed for the public lands regardless of whether such lands previously have been classified, withdrawn, set aside, or otherwise designated for one or more uses." (43 USC 1712)

The National Environmental Policy Act of 1969 (Public Law 91-190); Executive Order 11514 (35 FR 4247) enacted on March 5, 1970; guidelines by the Council on Environmental Quality (36 FR 1389) of January 28, 1971; and BLM Manuals 1791, 1792, and 2031 provide the authority, directives, and guidelines for enhancing and protecting the quality of the environment.

Local county governments have been authorized and instructed by the Colorado general assembly "to plan for and regulate the use of land within their respective jurisdictions" (Chapter 106 Colorado Revised Statutes, as amended). Of the four counties in which NRL lie, Ouray, Gunnison and Montrose have adopted formal zoning regulations. However, land use planning is in its infant stage in the area, and at the present time none of the counties involved has developed a useful comprehensive land use plan.

House Bill 1041 provides monies to counties to begin inventories on hazard areas, necessary to develop a comprehensive land use plan. The Clean Water Act (PL 92-500), section 208, concerns nonpoint pollutions of streams, and HB 1065 (The Mined Land Reclamation Act) provides for reclamation of mined or disturbed areas over 1,600 square feet.

Various controls and constraints are exercised by other federal, state, county, and city governmental agencies.

Development, management, use, and control or uses of federal lands have been delegated to such agencies as BLM, USFS, USBR, USGS, NPS, and USFWS. With certain exceptions, uses and controls come under the discretionary authority of the agency head. Controls are effected through issuance or nonissuance of a variety of leases, permits, licenses, etc. Additional policy guidance will be extended in greater detail through the Federal Land Policy and Management Act of 1976 (PL 94-579).

A number of state agencies have development and administrative authority over lands owned by the state of Colorado. The principal agencies are the State Land Board, Division of Parks and Recreation, Department of Health, Division of Wildlife, and Department of Natural Resources.

In summary, no significant controls or constraints, other than those necessary to manage the lands under the multiple-use concept, burden the lands involved in the proposed action.

Transportation Network

The ES area is serviced by all the conventional means of transportation. Two federal highways cross the unit. U.S. 50 runs from Gunnison west to Montrose, then north through Delta and on to Grand Junction. U.S. 550 runs from Durango north through Ouray to Montrose, where it joins U.S. 50 and the 550 number is dropped. Both highways are two-lane, asphalt, all-weather roads. Part of U.S. 50, north of Montrose to 1 mile from Olathe, is four-lane, divided, uncontrolled access; a portion through Delta is also four-lane.

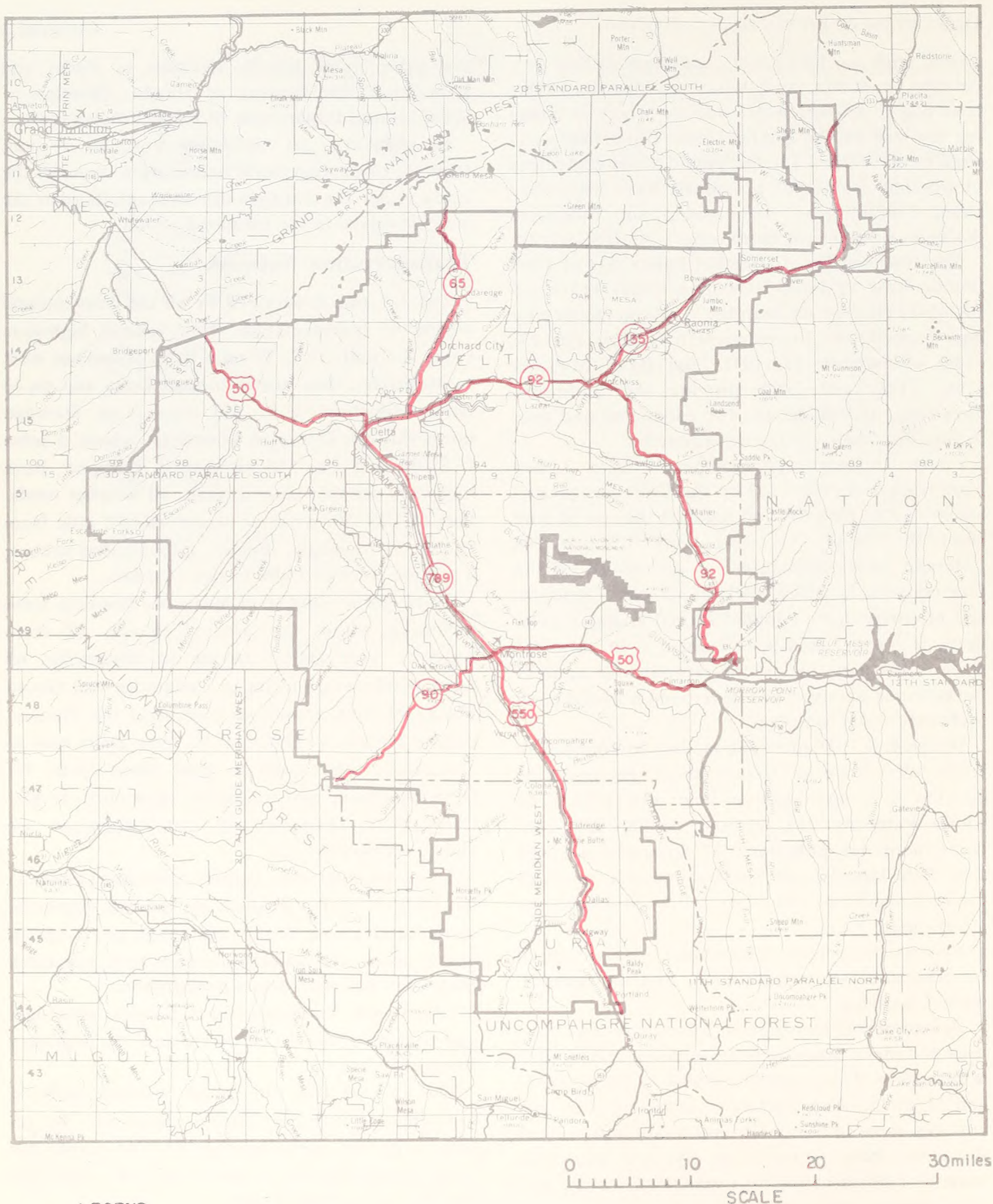
There are a number of surfaced, two-lane state highways within the area: Colorado 62 from Ridgway over Dallas Divide to Placerville; 65 from northeast of Delta to Cedaredge and Grand Mesa; 90 from Montrose west over the Uncompahgre Plateau to Naturita; 92 from Delta east to Hotchkiss, then south to Blue Mesa Dam; 135 from Hotchkiss east to Paonia, then north to McClure Pass. (Federal and state highways are shown on map 2-14.)

There are numerous county maintained roads in the ES area, most of which are located within the agricultural areas. Within the range and forested areas, there are numerous roads and two-track trails built primarily for administration.

Continental Trailways buses provide passenger and freight service to all towns on U.S. Highways 50 and 550.

The Denver and Rio Grand Western Railroad provides the only rail freight service into the ES area, with an approximately 65-mile trunk line from Grand Junction to Montrose and a spur line into the North Fork Valley.

The only regularly scheduled air passenger and freight service carrier in the ES area is Frontier Airlines, which provides flights three times daily, with service from Montrose to Grand Junction, Gunnison, and Denver. A number of small fields throughout the valley handle private planes.


Grand Junction
MESA
DELTA
MONTROSE
OURAY
SAN MIGUEL
GRAND MESA NATIONAL FOREST
UNCOMPAHGRE NATIONAL FOREST
UNCOMPAHGRE PLATEAU
BLUE MESA RESERVOIR
MORROW POINT RESERVOIR
Orchard City
Delta
Montrose
Ridgway
Ouray
Telluride
Placerville
Somerset
Paonia
Hotchkiss
Crawford
Redstone
Placita
Bridgeport
Olathe
Naturita
Nucla
Dallas
Maher
Castle Rock
Gateview
Lake City
Sunshine Pk
Redcloud Pk
Handies Pk
Uncompahgre Pk
Wetterhorn Pk
Sheep Mtn
Electric Mtn
Chair Mtn
Matchless Mtn
Mt Gunnison
Mt Garfield
Mt Sneffels
Cow Basin
Huntsman Mtn
Porter Mtn
Oil Well Mtn
Flint Man Mtn
Chair Mtn
Green Mtn
Jumbo Mtn
Coal Mtn
Saddle Pk
Landsend
Shavano Pk
Baldy Peak
Howard Pk
Mt Wilson
Wilson Mesa
Specie Mesa
Sawpit Mesa
Cactus Mesa
Roubideau
Escalante Forks
Peach Valley
Cory Point
Spring Creek Mesa
Flat Top
Cedaredge
Mt Lamborn
Mt Emmons
Mt Peak
Mt Abbe
Mt Sneffels
Camp Bird
Pandora
Ironton
Ames
Sunshine
Lizard Head Pass
Columbine Pass
Spruce Mtn
Stack Mtn
Horse Mtn
Whitewater
Skyway
Gateway
Bedrock
Paradox
Big Bend
Dominguez
Escalante
Kelso
Mesa
Cottonwood
Tabeguache
Uncompahgre
Dry Fork
Leopard Creek
Naturita Creek
Roubideau Creek
Big Creek
Cow Creek
Dry Creek
Cimarron
Gunnison
Uncompahgre River
Dominguez Creek
Escalante Creek
Kelso Creek
Mesa Creek
Cottonwood Creek
Tabeguache Creek

Socio-Economic Conditions

The ES area includes Delta County, Ouray County, the eastern half of Montrose County, and a small part of western Gunnison County (see map 2-15). With counties being the primary sub-state geopolitical entity for which socio-economic data are reported, the analysis of socio-economic conditions in this and subsequent chapters includes Delta, Montrose, and Ouray Counties. It is recognized that socio-economic data in western Montrose County may not exactly offset or match data not specifically included for the North Fork area in Gunnison County. However, the data or indicators for the three counties noted above are believed to depict accurately the socio-economic conditions in the ES area.

Population

The three-county ES area includes about 3.79 percent of Colorado's area and has a declining portion of the state's population. Between 1960 and 1970, the population declined by 0.82 percent to 35,198, which was 1.59 percent of the state total. Since 1970 the population decline has been reversed, with an estimated 1975 population of 37,289, representing an increase of 5.94 percent. Still the proportion of the state total has dropped to 1.39 percent.

Population density for Delta, Montrose, and Ouray Counties was 13.2, 8.2, and 2.9 persons per square mile respectively in 1970. Although almost 75 percent of the population is considered rural, most of the people actually live in or near small towns. Data on racial/ethnic composition indicate that over 98 percent of the population is white, with Spanish-Americans composing about 11 percent of the total population.

The region's scenic, recreational, and other qualities have made it attractive to retired and semi-retired people. The over-65 population ranges as high as 18 percent in Delta County, 10 percent in Montrose County, and 11 percent in Ouray County, in comparison with the state average of 8 percent of the total population.

The attractiveness of the region as a place to live, combined with anticipated growth in the minerals and manufacturing sectors, suggests that population levels will continue to increase. The "high" population projection of 38,371 people by 1980 appears to be more of a probability than a possibility.

Table 2-37 summarizes population, social, and economic characteristics for the three counties noted above and for Colorado Planning and Management Region 10, of which they are a part. It also contains comparable data for Colorado.

Income

As the data in table 2-37 indicate, income levels in the three counties and in Region 10 have risen over the past years but are still below statewide levels. The 1974 Region 10 per capita income of $3,951 is only 72 percent of the comparable state income of $5,514. Estimates of 1974 income indicate that, in Region 10, 10.5 percent of families had incomes under $3,000 and 41.4 percent had incomes over $10,000. Comparable state estimates are 6.6 percent and 63 percent respectively.

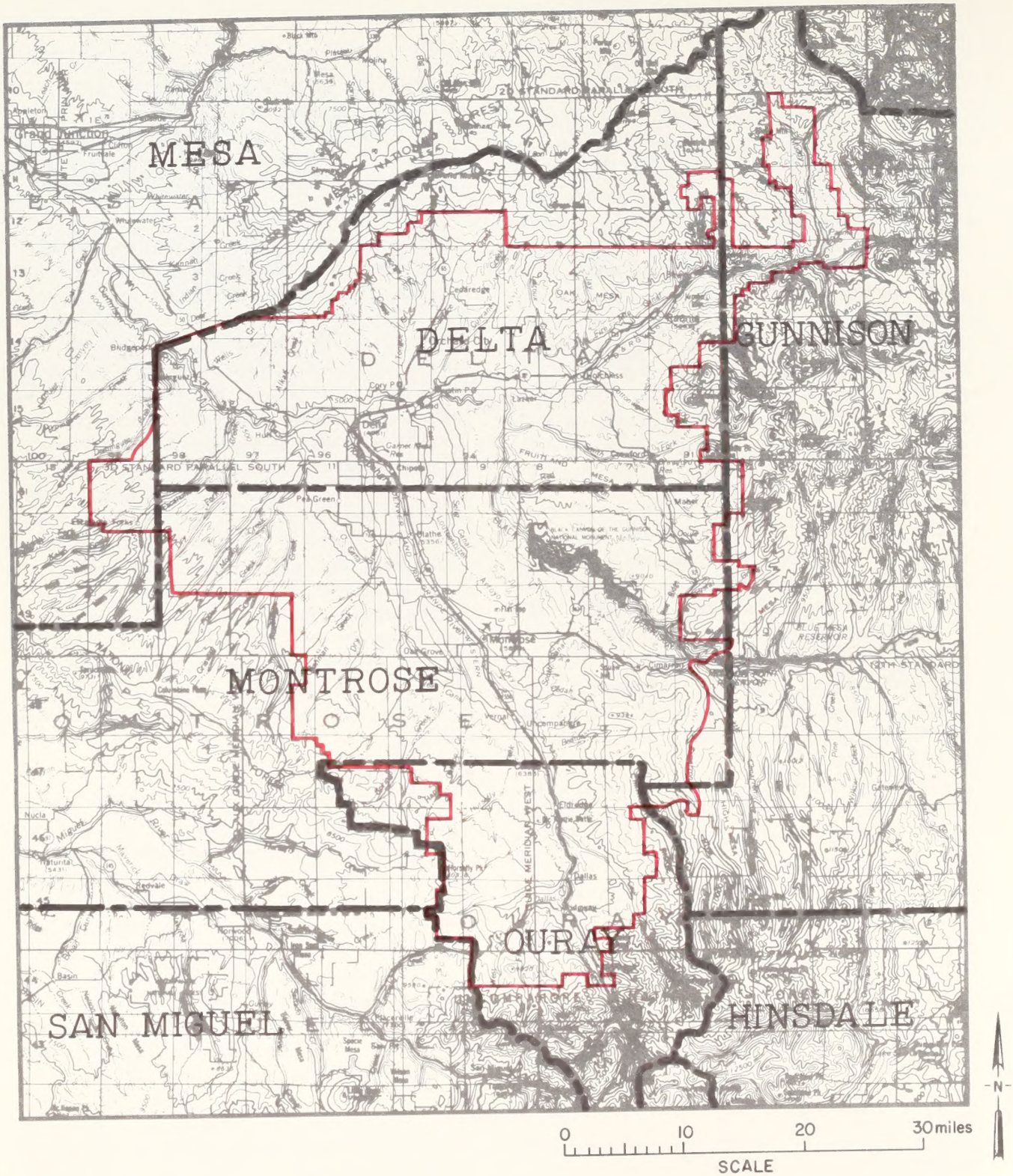
Other information, such as the number of families below the poverty level in 1970 and the population on welfare, documents existing income disparities. Other data from the 1970 census indicate that about 10 percent of year-round housing units lack all plumbing facilities in comparison with 5 percent statewide. Thus, although the ES area has experienced some economic growth and income levels have risen, there is still a significant income disparity when compared with statewide averages.

RANGE LIVESTOCK-RELATED INCOME

In 1970 livestock-related agricultural earnings totaled $6,285,000 or 7.29 percent of total earnings in Region 10. These earnings divided by the total required AUMs (2,166,437) of livestock-related forage for Region 10 indicate that each AUM of livestock feed yielded a direct income of $2.90. Multiplying this direct income effect by the Region 10 industry income multiplier of 1.487 produces a total income effect of $4.31 per AUM.

In the three-county ES region, an estimated 1,466,400 AUMs of feed were required for range livestock (cattle and sheep, excluding dairy cattle, etc.) in 1969, yielding a direct income of $4,252,560 and a total income of $6,323,527. By 1974, the total number of range livestock-related AUMs had increased by 3.03 percent to 1,510,800, yielding a direct income of $4,381,320 with a total (direct plus indirect or secondary effects) income effect of range livestock-related income equalling 4.19 percent of 1974 total personal income.

Though some revision may be appropriate, the estimate described above is believed to be relatively reliable. While livestock prices and produc-



LEGEND

County Line

E S Area

Map 2-15. Counties in the Environmental Statement Area

TABLE 2-37
SUMMARY OF POPULATION, SOCIAL, AND ECONOMIC CHARACTERISTICS

Indicator		County or Area				
		Delta	Montrose	Ouray	Region 10	Colorado
1970 Population		15,286	18,366	1,546	44,927	2,207,259
1975 Estimate		16,975	18,478	1,836	48,400	2,678,664
1970-75 % Change		+11	+1	+19	+8	+21
Projection for 1980	High	17,500	18,780	2,091	50,600	2,812,433
	Low	16,785	18,008	2,005	48,523	2,661,344
Projection for 2000	High	24,233	23,656	3,239	68,901	4,243,491
	Low	18,859	18,404	2,520	53,614	3,000,320 a/
Projection for 2006 b/	High	26,127	24,779	3,577	73,554	4,654,668
	Low	19,524	18,432	2,714	55,116	3,160,794
1970-2006 % Increase	High	71	35	131	64	111
	Low	28	0.0036	76	23	43
1970 Population Density (Persons/square mile)		13.2	2.4	8.2	5.0	21.0
Rural Population (Persons living in places of less than 2,500 people) (%)		75.8	64.6	100.0	67.1	21.5
Median age		39.6	29.1	31.2	29.5	26.2
Population on Welfare (%)		17.6	12.6	6.8	12.5	9.4
Receiving Food Stamps (%)		10.1	6.1	2.6	6.7	4.9
Ethnic/Racial Data by Major Group (%)						
Total White		98.9	97.7	99.7	98.2	95.7
Spanish		11.2	12.0	7.2	9.9	13.0
American Indian		0.2	1.6	0.1	1.1	0.4
Education - Median Grade Completed for Persons 25 years or older		11.9	12.1	12.2	-	12.4
Employment 1974 (est)						
Total Labor Force		5,991	8,229	870	19,916	1,139.4 (thous)
Number Employed		5,737	7,875	849	19,079	1,096.0 (thous)
Unemployed (%)		4.2	4.3	2.4	4.2	3.8
Income						
1970 Median Family Income		$5,943	7,362	7,245	-	9,555
1974 Median Family Income (est)		$7,550	9,350	9,200	8,690	12,330
1974 Total Personal Income		$62,483,000	84,422,000	8,440,000	194,017,000	13,765,574,000
Per Capita Personal Income		$3,813	4,308	4,876	3,951	5,514
Percent of Families With:						
Less than $3,000 Income		14.2	9.7	8.0	10.5	6.6
$10,000 or more		34.5	45.8	43.1	41.4	63.0
Families Below Poverty Level (1970) (%)		19.4	15.5	11.4	15.9	9.1

Source: Colorado Department of Health, Records and Statistics Section, "Demographic Profile, Colorado Planning and Management District 10," March 1975.
Colorado State Department of Local Affairs, Planning Division, "Colorado Population Projections 1970-2000, April 1976."
U.S. Dept. of Interior, Bureau of Land Management, "Socio Economic Data - Income, 1973."
Bureau of Land Management (Colorado), A Social-Economic Profile of the Black Canyon Region.
U.S. Department of Commerce - Regional Economics Information System, Bureau of Economic Analysis, "Personal Income by Major Source 1970-74."
a/ This datum is not accurate due to document damage; it reads 3,...,320. Since it cannot be corrected from the original source, it is listed as 3,000,320 for calculation purposes.
b/ These data were obtained by prorating above population data.

tion costs have both changed since 1969-70, no recent data are available to update the estimated income per AUM. If costs and prices both changed similarly, the income figure would not be altered. Livestock-related costs and prices may not necessarily move similarly during short, seasonal market fluctuations; however, according to data prepared by the Water Resource Council for the Economic Research Service (U.S. Department of Agriculture), cost-price movements (with respect to both direction and magnitude) may very well be similar over longer periods of time, such as 1970 to 1975.

In 1974, BLM provided about 35,000 AUMs, which accounted for 2.317 percent of the total. This provision resulted in direct income of $101,500 and total personal income of $150,930 for the three county ES region.

CONSTRUCTION-RELATED INCOME

Since implementation of the proposed action would require some construction affecting the regional construction industry, it should be noted that 1974 contract construction-related personal income for the ES region totaled $8,503,000 (U.S. Department of Commerce, Bureau of Economic Analysis 1970-1974). This was 5.474 percent of total personal income. With an estimated income multiplier effect of 1.119, the 1974 total direct and indirect income generated by contract construction was estimated to be $9,514,857.

RECREATION-RELATED INCOME

Income resulting from recreation-related activities is generally included in other categories, primarily wholesale and retail trade and service. Tourism and recreation are important in the local economy even though existing data resources do not disclose the extent of their significance. The ES area provides a wide array of recreational opportunities including rodeos, cultural activities, hunting, fishing, and other outdoor recreational activities.

The economic impacts of all recreational activities are not currently known. However, a recent study by Colorado State University estimates that total 1973 expenditures by sportsmen in Region 10 was $39,698,818 (Ross, Blood, and Nobe 1975). It is likely that only about 20 percent of these expenditures resulted in income to Region 10 residents. Yet, this $7,939,764 amounts to about 4 percent of total Region 10 income. Since the Colorado State University study focused only on hunting and fishing activities and did not include all recreation and tourism related-income, the real income effect of recreation is much larger. With data available only at the state planning and management region levels, it is difficult to determine what proportion of the income was captured by the ES counties.

It is possible that recreation-related income is captured generally in proportion with total personal income. Perhaps $6.35 million of the three-county income can be attributed to hunting and fishing-related recreation. Additional income from general recreational activities would add to this amount.

GOVERNMENT-RELATED INCOME

The 1974 personal income in the ES area resulting from total government employment (federal, state, local) was $21,810,000. This equaled 14 percent of total personal income for the area. Federal government employment accounted for $7,613,000 of the total and, with an estimated income multiplier effect of 1.692, resulted in direct and indirect income of $12,881,196. This income, added to income from state and local government employment which has an estimated income multiplier effect of 1.000 for the ES region, resulted in a total impact on personal income estimated to be $27,078,196.

Employment

Total employment in the ES area counties increased from 11,723 in 1970 to an estimated 14,461 in 1974. The unemployment rate dropped from 6.29 percent in 1970 to 4.17 percent in 1974. In 1970 the percent employed by sector was agriculture, 18 percent; mining, 7 percent; construction, 7.5 percent; wholesale trade, 2 percent; retail trade, 17.5 percent; services, 14 percent; finance, insurance, and real estate, 3.5 percent; and public administration and education 12.5 percent. Figure 2-10 shows the 1973 percentages of employment by sector for Region 10.

Since the 1970 census, a recession and subsequent economic expansion have further increased total employment, with manufacturing, mining, trade (primarily retail), and services becoming relatively more significant. Total governmental employment (including education, state and local public administration, and employment by federal agencies with local or regional offices) has expanded and is estimated to account for about 20 percent of total employment.

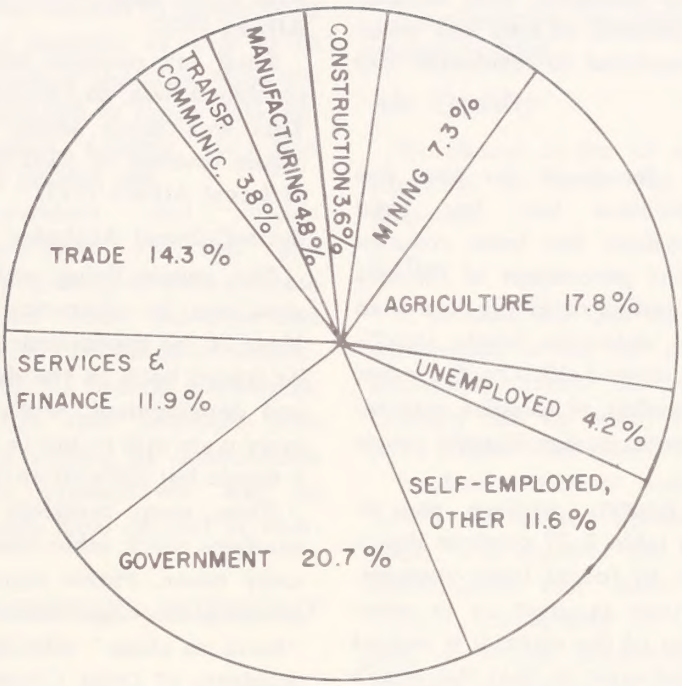


FIGURE 2-10 Chart of 1973 civilian workforce in Region 10 (Colorado Division of Commerce & Development 1975).

Scenic and recreational attractions of the area, its attractiveness as a place to live, and expansion of the mining and manufacturing sectors suggest that employment will continue to increase. As noted earlier, these increases in basic employment will add to population levels, thus generating expansion of the service sectors. Agricultural employment is expected to decrease, both directly and relatively to other sectors, as land and water are converted from agricultural to residential and business/industrial uses.

Social Well-Being

While the economic climate of the area has been improving, population loss has been reversed, and unemployment has been reduced below national levels, the percentage of families in each of the three counties receiving less than $3,000 income exceeds statewide levels significantly, as indicated in table 2-35. On the other end of the scale, the number of families with incomes of $10,000 or more is significantly lower than for the state.

Education, housing, poverty, welfare, and income data as shown in table 2-37 confirm that a disparity exists in spite of recent improvements. While the disparity is not as great as in some other counties or regions of the state, it is indeed real. The most vivid indicator is that the area's per capita personal income was only 72 percent of the state average in 1974.

Some of these differences may be explained by acknowledging the presence of retired and semi-retired people who are likely to be living on incomes that do not expand with either inflation or the economic health of an area. Yet this does not account for all of the disparity, which means that a significant segment of the area's residents are living at subsistence levels. A need to incorporate these individuals and families into the economic fabric of the region is apparent. Even though the living environment is widely acknowledged as highly desirable, the majestic scenery and recreational opportunities are not total substitutes for employment, income, or food.

Public Finance and Tax Base

The combined assessed valuation for the three ES counties in 1975 was $86,608,980, which resulted in a per capita assessed valuation of $2,322.64, considerably lower than the per capita assessed valuation of $3,149.31 for Colorado. Thus, the ES counties have a smaller tax base (per capita) for generation of needed or desired revenue. (Colorado Department of Local Affairs 1975)

The 1975 Total Average County Levy for Montrose and Ouray counties of 82.89 and 81.23 mills respectively was slightly below that of 83.43 mills for the state. Delta County was significantly lower with 65.82 mills. (Colorado Department of Local Affairs 1975)

Total tax revenue for the three ES counties combined was $6,534,707 or $175.24 per capita. This was much lower than the Colorado per capita revenue of $262.75. (Colorado Department of Local Affairs 1975)

Socio-Cultural Attitudes

The people living within the three county ES area can be characterized as "rural-western." Most of the predominant values and attitudes can be traced back to the days of mining discoveries and development, when ranchers and early farmers were still trying to settle and gain control of a scenic but difficult environment.

Thus, many residents retain much of the laissez-faire work ethic that was dominant in those early times. Public input at a number of BLM planning meetings indicates the existence of such "leave us alone" attitudes. For example, in 1974 residents of Delta County rejected a referendum on county-wide zoning. Many felt that any controls on property-use rights are an unwarranted and unconstitutional interference with the owner's right to use that property. These meetings have indicated a strong support for continued economic growth and for local control of private and public lands resources. On the other hand, a strong desire for "controlled" or manageable growth has been voiced.

Other proposals and meetings have indicated a local opposition to special designation of public lands for protection of wild, scenic, or unique environmental values. At almost every meeting, a multiple-use philosophy for management of public resources has been voiced. While a local minority is concerned about environmental issues, such as the protection or preservation of the region's outstanding natural and environmental values, another minority occasionally expresses resentment against "unwanted" tourists or the nonlocal users of public resources.

In summary, the residents can generally be described as conservative in their socio-political

attitudes, placing a high value on an attachment to the land and its traditional uses.

With respect to livestock operators specifically, most support the multiple-use management philosophy. They believe strongly in the social and economic importance of their vocations and feel that continued livestock grazing on public lands is both desirable and needed to supply food to regional and national markets as well as to maintain the economic base of the area. Most are also in favor of the installation of range improvements (water developments, fencing, etc.) that would facilitate domestic grazing use.

Most livestock operators also readily acknowledge the importance of soil and watershed conservation practices, as well as some management systems that would preserve and protect the range resource. Imposition of restrictive management practices by federal employees, however, especially when they interfere with established patterns, are viewed as unnecessary intrusions on operator prerogatives and as definitely inconsistent with local control or decision making.

FUTURE ENVIRONMENT WITHOUT THE PROPOSAL

The following sections describe the possible future environment of the ES area at the end of 28 years (2006) if the action proposed in chapter 1 is not implemented. (The time scale is equivalent to the eight years of implementation plus twenty years to achieve objectives established for proposed action.) They deal only with the resources or land uses described in the preceding sections of chapter 2 which are expected to change in the future. It is assumed that the eight existing AMPs would be continued (4007 Sawmill Mesa, 4012 Canal, 4013 Ben Lowe, 4503 Stingley Gulch, 4528 Oak Ridge, 4537 Young's Peak, 5516 Piney, and 5521 Highway 90) and that twelve new AMPs would be implemented by 2006 (4006 Dry Mesa, 4008 25 Mesa, 4502 Surface to Leroux, 4529 Reynolds Creek, 4530 McDonald Mesa, 4549 Dry Creek, 5017 Green Mountain, 5020 Black Ridge, 5507 Pipeline, 5508 Government Springs, 5520 Lower Horsefly, 5522 Beaver Hill). This assumption is based on present personnel and funding available to the Uncompahgre Basin Resource Area.

Topography and Geology

No changes in the topography or geology of the ES area are expected by 2006. Any future development of the energy minerals program will not involve surface mining.

Climate

No change in the climate of the ES area is expected by 2006.

Air Quality

No change in the air quality of the ES area is expected by 2006. No surface mining is anticipated.

Soils

It is expected that the future condition of the watersheds in the ES area will not be changed drastically from the present situation. Any changes that do occur should in most instances have a beneficial effect.

Implementation of management plans, such as AMPs, habitat management plans, and watershed plans, will improve the condition of the present environment (see table 2-38 under Vegetation below). Availability of funds will determine the rate at which implementation will take place, thereby governing the effects of such plans on the present environment. Laws, such as the Federal Water Pollution Control Act, will probably also help improve the watershed condition.

Water Resources

Under the present grazing system, no improvement in watershed condition is anticipated by the year 2006. There may be increases or decreases in runoff with increases or decreases in annual precipitation. However, these runoff changes do not depend entirely on the grazing system; they depend on cyclic variations in the climate and associated changes in watershed conditions and storm characteristics. Similar changes in the soil water regime may occur due to variations in the mean annual temperature.

Because there will probably be very little change in watershed conditions for those watersheds in which AMPs are not implemented, changes in sediment yield should be negligible and water quality changes will probably be insignificant. However, trends in hydrologic condition of BLM rangeland have not been established in

Colorado. Without a hydrologic data base, predicted changes in watershed condition are only speculative.

Vegetation

Continued development of private grazing lands for residential and industrial uses will increase forage demands on NRL and private grazing lands. Wildlife dependence on browse species on NRL will continue to increase in direct proportion to the amount of acreage developed for other uses. However, although demands for NRL vegetation will increase, the amount of vegetation will decrease by approximately 2 percent. (Refer to table 2-38.)

Energy mineral exploration and developments are expected to increase drastically in the North Fork Valley; with this increased mineral activity will come increased surface disturbance. Considering present BLM guidelines, this disturbance will cause a change in species composition together with a minute (less than 0.1 percent) decrease in amount of forage.

Overall range condition is a product of existing trends and is expected to remain unchanged on the areas not already included in grazing systems. Table 2-38 indicates expected vegetative production (in AUMs), vegetative density, and percent composition of key species by allotment if the proposed action is not implemented.

Threatened or Endangered Species

A list of threatened or endangered species in the ES area is being prepared (see vegetation section earlier in this chapter). Further studies may result in identification and location of additional plant species. Increased interest would increase the possibility of discovering additional species.

Wildlife

Terrestrial

Population trends for the terrestrial wildlife in the ES area are not expected to be significantly different in 2006. Browse condition is not expected to change from its present status (a conclusion reached in cooperation with the DOW). According to observations by WCOs, BLM biologists, and DOW biologists, browse condition has not improved in the ES area in the past twenty years. In addition, the type of management in the future is not expected to be different from the management which resulted in the past and present browse condition. Therefore, big game population numbers are not expected to differ without the proposed action from what they are at the present time.

It is expécted that the projected implementation of twenty AMPs would alleviate significant livestock-wildlife competition on areas where competition now occurs. The AMPs would result in improved range condition and increased big game forage. Nevertheless, losses of habitat due to human pressure would offset any wildlife population gains on NRL and would, at best, result in similar populations. Human populations, with their economic and recreational pursuits, will undoubtedly have a negative effect on wildlife populations in the future.

Mule deer, elk, and antelope are generally tolerant of humans. However, their populations would continue to decline in the future because of loss of habitat, especially as a result of subdivisions and human harassment. The most crucial forms of harassment occur during periods of stress, e.g., snowmobiling on winter ranges or disturbing fawning or calving ranges by off-road vehicles, hikers, and campers. Populations of other tolerant animals would also decline an unknown amount for similar reasons.

Other animals less tolerant of human disturbance face even greater odds against maintenance of productive populations. These animals include mountain lions, black bear, golden eagles, prairie falcons, the endangered peregrine falcon, and hypothetical populations of the black-footed ferret. Large predatory animals, such as mountain lions and black bears, and raptors, such as golden eagles and prairie falcons, would probably continue to inhabit the area, but they would also continually seek more remote areas and their numbers would decrease. Endangered species, such as the black-footed ferret (if present), would also continue to decline and could eventually disappear in spite of efforts to preserve them.

Aquatic and Riparian

The condition of small stream aquatic habitats directly parallels the condition of riparian vegetation. Changes in riparian vegetation reflect directly on changes in aquatic habitat.

Continuing the present grazing use would not allow the recovery of riparian or aquatic habitats that are presently in less than good condition.

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)			
4001 Dominguez	5,600	41,020		Hija	Atca			4,320		Hija	Atca		
Pinyon-Juniper			55	1	2				45	1	2		
Saltbush			12	2	5				12	2	4		
Desert Shrub			12	2	5				12	2	3		
Sagebrush			51	1	2				40	1	2		
4002 Lower Escalante	335	1,665		Orhy	Atca			280		Orhy	Atca		
Pinyon-Juniper			50	10	10				45	10	10		
Saltbush			36	5	10				30	5	10		
Desert Shrub			15	T	-				15	T	-		
Sagebrush			24	T	-				20	T	-		
4005 Fall Cabin	40	300		Sihy	Epvi			40		Sihy	Epvi		
Pinyon-Juniper			34	6	3				34	6	3		
4006 Dry Mesa	1,185	14,160		Orhy	Atca	Artemisia		1,585		Orhy	Atca	Artemisia	
Pinyon-Juniper			70	5	-	30			80	10	-	35	
Saltbush			50	10	20	20			55	15	25	22	
Sagebrush			50	5	T	40			55	10	10	40	
4007 Sawmill Mesa	790	9,170		Hija	Kocr	Atca	Arno	1,210		Hija	Kocr	Atca	Arno
Pinyon-Juniper			45	22	3	3	7		60	25	10	5	10
Saltbush			19	84	-	11	-		30	84	-	15	-
Sagebrush			24	42	-	-	17		40	42	-	-	20
4008 25 Mesa	810	6,630		Hija	Atca	Spcr		985		Hija	Atca	Spcr	
Pinyon-Juniper			32	21	4	-			40	25	10	-	
Saltbush			36	25	10	-			45	25	15	-	
Broadleaf Trees			67	-	3	33			70	-	3	33	
4010 Monitor Mesa	1,435	8,760		Hija	Kocr	Arno	Atca	1,300		Hija	Kocr	Arno	Atca
Pinyon-Juniper			32	5	3	10	1		30	5	3	10	1
Sagebrush			50	7	2	8	1		45	7	2	8	1
				Spcr						Spcr			
Broadleaf Trees			67	33	-	-	3		40	25	-	-	2
4011 Lower Roubideau	45	400		Spcr	Atca			10		Spcr	Atca		
Broadleaf Trees			67	33	3				40	30	3		

Note: Present production, vegetative density, and species composition are based on Bureau of Land Management, Uncompahgre Basin Resource Area, unit resource analyses and allotment management plans. For a discussion of methodology and data base for current production levels, refer to appendix 4.
Potential production is based on two reports by the Soil Conservation Service: the Paonia Soil Survey Report and the Ridgway Soil Survey Report. For a discussion of methodology and data base for potential production, see appendix 4.
Predicted production and other information are based on present trend studies and apparent trend of each allotment in the Uncompahgre Basin Resoure Area. It was assumed that current range trend will not change by 2006 on allotments without AMPs.
a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.
b/ Vegetative density as defined in the glossary is presented as a representative number for the whole type.
c/ "T" = trace. "-" = not a key species in that type in that allotment. "0" = no trace of this key species present in that type in that allotment.
See list at end of table for scientific and common names of key species listed here by scientific abbreviations.

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4012 Canal	1,000	8,875		Orhy Kocr Atca	1,220		Orhy Kocr Atca
Pinyon-Juniper			25	2 1 2		50	10 10 10
Saltbush			20	1 - 1		30	5 - 5
4013 Ben Lowe	570	4,570		Orhy Hija Atca Cemo	755		Orhy Hija Atca Cemo
Pinyon-Juniper			53	1 4 - 1		65	10 10 - 10
Saltbush			43	3 10 3 -		50	10 15 10 -
Sagebrush			36	2 10 - -		45	10 15 - -
4014 Joker	115	1,050		Agro- pyron Amal			Agro- pyron Amal
Pinyon-Juniper			35	70 3		45	70 3
4015 White Ranch	25	265		Hija Atca Cemo	35		Hija Atca Cemo
Pinyon-Juniper			30	20 4 3		40	25 10 5
4016 Wells Gulch	2,680	7,160		Hija Orhy Atco Atca	2,680		Hija Orhy Atco Atca
Pinyon-Juniper			58	26 T 2 -		58	26 T 2 -
Desert Shrub			16	20 5 2 1		16	20 5 2 1
4017 Alkali Flats	3,560	12,220		Hija Orhy Atco Atca	2,780		Hija Orhy Atco Atca
Pinyon-Juniper			36	- 6 9 5		30	- 6 9 5
Saltbush			19	- - - 21		15	- - - 20
Desert Shrub			25	20 T 25 5		20	20 T 25 5
Mountain Shrub			50	- 2 - 2		47	- 2 - 2
Sagebrush			24	42 T - -		20	35 T - -
4021 Point Creek	115	390		Hija Orhy Atco Atca	95		Hija Orhy Atco Atca
Desert Shrub			20	5 2 1 1		18	5 2 1 1
4022 Petrie Mesa	1,430	4,415		Hija Orhy Atri- plex Eula	1,090		Hija Orhy Atri- plex Eula
Pinyon-Juniper			31	3 1 11 -		31	3 1 11 1
Saltbush			24	7 1 30 5		20	7 1 25 3
Desert Shrub			13	Spcr 1 - 2 -		10	Spcr 1 - 2 -
4024 Dirty George	300	2,470		Hija Stvi Cemo Amal	200		Hija Stvi Cemo Amal
Pinyon-Juniper			49	10 - 1 2		40	8 - 1 2
Mountain Shrub			65	- 1 8 6		55	- 1 6 5
4025 Ward Creek-Doughspoon	700	6,505		Hija Atca Atco	650		Hija Atca Atco
Pinyon-Juniper			39	10 3 3		35	10 3 3
Saltbush			36	5 10 10		30	5 8 8
Desert Shrub			24	1 10 7		24	1 8 7
4026 Escalante Canyon	40	1,040		Hija Artr	40		Hija Artr
Pinyon-Juniper			40	15 5		40	15 5
Saltbush			30	15 5		30	15 5
4501 Milk Creek	15	115		Kocr Orhy Artr	15		Kocr Orhy Artr
Mountain Shrub			75	11 9 60		75	11 9 60

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4502 Surface to Leroux	495	2,630		Popr Agsm Cemo	655		Popr Agsm Cemo
Pinyon-Juniper			36	2 1 8		50	10 10 10
Mountain Shrub			75	4 4 3		80	15 15 10
4503 Stingley Gulch	125	1,070		Orhy Pose Pera Cemo	150		Orhy Pose Pera Cemo
Pinyon-Juniper			40	1 0 - 2		55	10 5 - 10
Mountain Shrub			55	4 8 3 7		70	10 10 5 10
4504 Leroux Creek	195	2,380		Stco Orhy Cemo Artr	140		Stco Orhy Cemo Artr
Pinyon-Juniper			37	- T 5 35		30	- T 2 35
Mountain Shrub			63	2 2 3 16		55	2 2 3 16
4505 Juniper Knob	10	75		Orhy Atca	10		Orhy Atca
Pinyon-Juniper			35	3 3		35	3 3
4506 Oak Mesa	95	1,190		Orhy Basa Cemo	80		Orhy Basa Cemo
Pinyon-Juniper			35	3 3 3		35	2 3 2
Mountain Shrub			72	7 7 1		65	5 7 1
4507 Jay Creek	1,030	7,295		Orhy Cemo	800		Orhy Cemo
Pinyon-Juniper			49	T 10		45	T 8
Mountain Shrub			72	1 14		60	T 10
4509 Upper Jay Creek	75	480		Agtr Atca	50		Agtr Atca
Pinyon-Juniper			28	5 3		25	2 2
Mountain Shrub			60	10 10		50	5 5
4511 Overland	20	180		Orhy Amal	20		Orhy Amal
Mountain Shrub			51	2 65		51	2 65
4512 East Roatcap	10	40		Agtr Amal	10		Agtr Amal
Mountain Shrub			51	2 65		51	2 65
4513 Stevens Gulch	865	4,325		Orhy Sihy Cemo	650		Orhy Sihy Cemo
Pinyon-Juniper			49	- 4 10		45	- 2 8
Mountain Shrub			72	1 4 3		65	1 3 3
Sagebrush			44	2 2 2		40	1 1 1
4514 Upper Terror Creek	5	35		Orhy Sihy Amal	5		Orhy Sihy Amal
Mountain Shrub			76	2 4 4		76	2 4 4
4515 Freeman Gulch	70	615		Agsm Cemo	70		Agsm Cemo
Pinyon-Juniper			52	4 6		52	4 6
Mountain Shrub			76	4 6		76	4 6
4516 North Fork	2,630	10,775		Hija Atca Orhy Cemo	2,165		Hija Atca Orhy Cemo
Pinyon-Juniper			56	10 6 T 3		45	10 5 T 2
				Atco			Atco
Saltbush			15	15 24 - -		13	15 22 - -
Desert Shrub			14	8 22 - -		12	8 20 - -
				Brin Amal			Brin Amal
Mountain Shrub			83	3 2 - -		65	3 2
				Hija Arno			Hija Arno
Sagebrush			38	34 13 - -		35	30 10 - -
				Atco			Atco
Annuals			24	33 21 - -		24	33 21 - -

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4517 Coal Gulch	770	6,890		Orhy Stco Cemo	595		Orhy Stco Cemo
Pinyon-Juniper			45	8 2 10		40	5 2 5
Mountain Shrub			82	8 2 5		65	5 2 5
4518 Pilot Creek	40	60		Agsm Amal	40		Agsm Amal
Mountain Shrub			90	10 T		90	10 T
4519 Muddy Creek	25	530		Brin Putr	25		Brin Putr
Mountain Shrub			85	10 2		85	10 2
Sagebrush			55	10 2		55	10 2
4520 Spring Creek	30	135		Brin Putr	30		Brin Putr
Mountain Shrub			85	10 2		85	10 2
4521 Stock Driveway	10	135		Brin Amal	10		Brin Amal
Mountain Shrub			82	4 5		82	4 5
4522 Downing	30	135		Brin Amal	30		Brin Amal
Mountain Shrub			82	4 5		82	4 5
4523 Williams Creek	10	120		Feid Cemo	10		Feid Cemo
Mountain Shrub			75	5 5		75	5 5
4524 Deep Creek	10	180		Feid Artr	10		Feid Artr
Mountain Shrub			80	5 10		80	5 10
Conifer			90	2 1		90	2 1
4525 Anthracite Creek	170	1,215		Agtr Stco Cemo Artr	125		Agtr Stco Cemo Artr
Mountain Shrub			62	2 3 5 16		52	2 3 2 10
Conifer			76	4 - T 5		65	3 - T 2
Broadleaf Trees			76	4 - T 5		65	2 - T 2
4526 Crystal Creek	60	425		Orhy Amal	60		Orhy Amal
Mountain Shrub			80	5 5		80	5 5
Conifer			75	T 2		75	T 2
4527 Jumbo Mountain	700	4,330		Stco Orhy Cemo Artr	555		Stco Orhy Cemo Artr
Pinyon-Juniper			46	- T 11 7		40	- T 8 7
				Atca			Atca
Saltbush			33	- T 6 -		25	- T 5 -
				Cemo			Cemo
Mountain Shrub			71	1 1 1 14		65	1 1 1 12
Sagebrush			44	2 2 2 57		40	2 2 2 50
				Syor			Syor
Conifer			90	6 - 6 -		80	5 - 5 -
Broadleaf Trees			90	6 - 6 -		80	5 - 5 -
4528 Oak Ridge	335	3,095		Orhy Agtr Artr	400		Orhy Agtr Artr
Pinyon-Juniper			47	T 1 28		55	10 10 30
				Amal			Amal
Mountain Shrub			70	3 3 35		80	10 10 35
				Artr			Artr
Sagebrush			40	0 0 85		50	5 5 70

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4529 Reynolds Creek	190	1,335		Orhy Agtr Artr	210		Orhy Agtr Artr
Pinyon-Juniper			47	T 1 28		55	10 10 30
				Amal			Amal
Mountain Shrub			82	1 T 18		82	10 10 15
				Artr			Artr
Sagebrush			36	0 0 100		50	5 5 80
4530 McDonald Mesa	205	2,105		Agsm Atca Atco	310		Agsm Atca Atco
Pinyon-Juniper			45	3 5 -		55	10 10 -
Saltbush			20	5 10 10		30	10 15 10
Sagebrush			25	5 5 15		40	10 10 15
4531 Popp Ranch	15	260		Orhy Artr	15		Orhy Artr
Pinyon-Juniper			47	T 28		47	T 28
Sagebrush			36	- 100		36	- 100
4532 McDonald Ranch	725	3,060		Agsm Hija Atco Atca	585		Agsm Hija Atco Atca
Pinyon-Juniper			20	T 5 5 5		20	T 2 5 2
Saltbush			17	5 5 15 5		10	2 2 10 2
Sagebrush			28	5 5 5 10		25	3 3 5 5
4535 Home Place	15	100		Sihy Atco	15		Sihy Atco
Saltbush			28	5 64		28	5 64
4536 West Young's Peak	10	100		Agsm Atco Cemo	10		Agsm Atco Cemo
Pinyon-Juniper			73	1 - 4		73	1 - 4
Saltbush			28	- 64 -		28	- 64 -
4537 Young's Peak	240	1,500		Agsm Cemo	280		Agsm Cemo
Pinyon-Juniper			73	1 4		75	10 10
4538 Missouri Flats	5	135		Popr Amal	5		Popr Amal
Mountain Shrub			82	1 18		82	1 18
4539 Cottonwood Creek	10	135		Popr Amal	10		Popr Amal
Mountain Shrub			82	1 18		82	1 18
4540 North Saddle Peak	40	265		Popr Amal	30		Popr Amal
Mountain Shrub			82	1 18		70	1 15
4541 Sunshine Mesa	5	25		Sihy Amal	0		Sihy Amal
Pinyon-Juniper			24	20 41		20	10 25
4543 South Saddle Peak	20	255		Orhy Cemo	20		Orhy Cemo
Pinyon-Juniper			46	T 15		46	T 15
4548 Creek Bottom	10	175		Agtr Artr	10		Agtr Artr
Conifer			76	4 5		76	4 5
Broadleaf Trees			76	4 5		76	4 5
4549 Dry Creek	265	3,380		Orhy Cemo	410		Orhy Cemo
Pinyon-Juniper			42	2 2		55	10 5
Mountain Shrub			55	1 4		70	10 10

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5002 Dedication Site	100	1,575		Hija Atca	100		Hija Atca
Pinyon-Juniper			31	10 19		31	10 19
5003 Selig Canal	725	2,565		Stco Atri-plex	635		Stco Atri-Plex
Pinyon-Juniper			30	27 3		30	20 3
Saltbush			12	Orhy T 30		10	Orhy T 20
Mountain Shrub			56	Feid Artr 18 23		50	Feid Artr 10 15
5008 Brush Point	1,755	4,625		Hija Atco	1,450		Hija Atco
Pinyon-Juniper			30	10 15		25	10 10
Saltbush			20	15 25		10	10 20
Barren			0	- -		-	- -
5010 Dead Horse	200	850		Brin Cemo	135		Brin Cemo
Mountain Shrub			83	3 T		70	3 T
Sagebrush			75	T T		65	T T
5011 Gould Reservoir	390	2,510		Orhy Amal	315		Orhy Amal
Mountain Shrub			68	T 14		65	T 10
Sagebrush			41	T 7		35	T 7
5012 Cedar Point	80	405		Orhy Amal	70		Orhy Amal
Pinyon-Juniper			55	1 15		55	1 15
Mountain Shrub			70	T 10		65	T 10
Sagebrush			80	1 10		70	1 10
5013 Iron Canyon	135	1,115		Orhy Arno	110		Orhy Arno
Pinyon-Juniper			48	T 23 Amal		45	T 20 Amal
Mountain Shrub			68	T 14		60	T 10
Sagebrush			41	T 7		40	T 7
5014 Poison Spring	145	1,155		Orhy Arno	145		Orhy Arno
Pinyon-Juniper			48	T 6		48	T 6
Mountain Shrub			65	T 14		65	T 14
Sagebrush			63	T 14		63	T 14
5015 Grizzly Gulch	260	1,715		Orhy Amal	260		Orhy Amal
Mountain Shrub			65	T 20		65	T 20
Sagebrush			41	T 5		41	T 5
5016 Black Canyon	45	390		Kocr Amal	45		Kocr Amal
Mountain Shrub			80	10 19		70	10 15
Sagebrush			40	5 10		40	5 10
5017 Green Mountain	2,825	10,560		Kocr Orhy Amal Atca	3,725		Kocr Orhy Amal Atca
Pinyon-Juniper			40	- T - 1		60	- 10 - 10
Mountain Shrub			55	24 - 20 -		65	25 - 25 -
Sagebrush			42	20 5 5 -		55	25 10 10 -

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5020 Black Ridge	605	4,155		Orhy Artr Atca	765		Orhy Artr Atca
Pinyon-Juniper			44	2 - T		60	10 - 10
Sagebrush			28	T 40 -		40	10 40 -
5022 Rabbit Gulch	70	300		Orhy Arno Atca	70		Orhy Arno Atca
Pinyon-Juniper			45	4 - T		45	4 - T
Sagebrush			38	T 13 -		38	T 13 -
5025 Fruitland Mesa	5	50		Hija Artr	5		Hija Artr
Pinyon-Juniper			50	5 20		50	5 20
5026 Star Nelson Airport	5	15		Sihy Atco	5		Sihy Atco
Saltbush			15	2 5		15	2 5
5027 Adobe	30	335		Orhy Pera	30		Orhy Pera
Pinyon-Juniper			63	5 38		63	5 38
Sagebrush			55	5 10		55	5 10
5028 Doug Creek	70	445		Orhy Pera	65		Orhy Pera
Pinyon-Juniper			63	5 38		60	5 35
5029 Spring Gulch	150	480		Brin Cemo	140		Brin Cemo
Mountain Shrub			83	5 T		80	5 T
Sagebrush			75	T T		70	T T
Conifer			85	- -		85	- -
Broadleaf Trees			76	- -		76	- -
5030 Bostwick Park	380	750		Orhy Atco Artr	350		Orhy Atco Artr
Pinyon-Juniper			40	3 - 3		35	3 - 3
Saltbush			30	- 20 -		20	- 20 -
Mountain Shrub			60	5 - 5		55	5 - 5
5033 Pinyon Springs	160	860		Agsm Amal	160		Agsm Amal
Pinyon-Juniper			45	4 4		45	4 4
Mountain Shrub			63	T 29		63	T 29
5036 Big Gulch	5	25		Spcr Atco	5		Spcr Atco
Desert Shrub			11	2 18		11	2 18
5037 Black Mesa	0*	0		Spcr Atco	0*		Spcr Atco
Mountain Shrub			-	- -		-	- -
Conifer			-	- -		-	- -
5038 Red Canyon	5	55		Hija Artr	5		Hija Artr
Pinyon-Juniper			50	5 20		50	5 20
5039 Onion Valley	20	35		Stvi Amal	20		Stvi Amal
Mountain Shrub			55	20 25		55	20 25
5040 Pine Ridge	15	70		Stvi Amal	15		Stvi Amal
Mountain Shrub			50	15 25		50	15 25
Broadleaf Trees			80	15 -		80	15 -

* This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5041 East Gould Reservoir	40	530		Agsm Artr	35		Agsm Artr
Sagebrush			39	3 74		35	3 74
5043 Collins	15	305		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			55	T 15		55	T 15
5044 Big Pasture	20	220		Orhy Cemo	20		Orhy Cemo
Pinyon-Juniper			55	T 15		55	T 15
				Artr			Artr
Sagebrush			45	T 40		45	T 40
5045 Black Bullet	5	55		Hija Artr	5		Hija Artr
Pinyon-Juniper			55	5 20		55	5 20
5046 Big Gulch	35	190		Agsm Atca	35		Agsm Atca
Pinyon-Juniper			45	5 10		45	5 10
Desert Shrub			11	5 10		11	5 10
5047 Mesa Creek	75	115		Stvi Amal	75		Stvi Amal
Mountain Shrub			75	10 15		75	10 15
Conifer			80	10 10		80	10 10
5048 Morrow Point	40	60		Stvi Amal	40		Stvi Amal
Mountain Shrub			75	10 15		75	10 15
Conifer			80	10 10		80	10 10
5049 Smith Fork	30	255		Orhy Artr	25		Orhy Artr
Pinyon-Juniper			45	4 13		40	4 13
5050 Allen Reservoir	30	220		Orhy Pera	30		Orhy Pera
Pinyon-Juniper			63	5 38		63	5 38
Sagebrush			55	T 10		55	T 10
5502 Sandy Wash	940	6,275		Hija Atca	805		Hija Atca
Pinyon-Juniper			51	12 5		45	12 5
Waste			43	31 2		35	20 2
5503 Green	50	375		Orhy Atca	40		Orhy Atca
Pinyon-Juniper			25	4 1		25	2 1
5504 Roatcap	350	2,560		Hija Atca	280		Hija Atca
Pinyon-Juniper			25	20 1		25	15 1
Sagebrush			30	10 1		25	5 1
				Orhy			Orhy
Grass			60	15 5		45	10 5
5505 Transfer	300	2,475		Orhy Cemo	205		Orhy Cemo
Pinyon-Juniper			51	10 1		45	6 1
				Arno			Arno
Waste			43	T 9		35	T 9
5507 Pipeline	2,270	15,990		Orhy Cemo	2,890		Orhy Cemo
Pinyon-Juniper			44	5 2		60	10 10
				Hija Artr			Hija Artr
Halfshrub			59	37 2		65	40 10

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5508 Government Springs	180	1,885		Orhy Cemo	225		Orhy Cemo
Pinyon-Juniper			40	15 1		55	20 5
5509 Coal Creek	50	265		Hija Bogr	50		Hija Bogr
Halfshrub			59	37 31		59	37 31
5510 Bald Hills	25	170		Kocr Amal	25		Kocr Amal
Mountain Shrub			80	5 15		80	5 15
Sagebrush			65	5 5		65	5 5
5511 Shavano Mesa	200	1,630		Hija Atca	140		Hija Atca
Pinyon-Juniper			35	15 T		30	15 T
Sagebrush			45	15 T		40	15 T
Halfshrub			65	10 T		55	10 T
5512 Franklin Mesa	355	3,000		Hija Artr	335		Hija Artr
Pinyon-Juniper			35	15 10		35	15 10
Sagebrush			40	10 25		35	10 25
Grass			40	10 25		35	10 25
5513 Dry Creek Basin	410	4,520		Orhy Artr	395		Orhy Artr
Pinyon-Juniper			57	9 28		55	8 25
Sagebrush			45	T 30		40	T 30
5514 East Fork Dry Creek	15	115		Orhy Amal	15		Orhy Amal
Pinyon-Juniper			60	10 5		60	10 5
Mountain Shrub			90	15 20		90	15 20
				Artr			Artr
Sagebrush			60	15 20		60	15 20
Broadleaf Trees			75	- -		75	- -
5515 Olathe Reservoir	15	155		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			57	7 9		57	7 9
Mountain Shrub			90	15 15		90	15 15
5516 Piney	800	6,945		Orhy Amal	1,110		Orhy Amal
Mountain Shrub			40	10 20		55	10 20
				Artr			Artr
Sagebrush			35	5 35		45	10 40
5517 Spring Creek Canyon	35	370		Orhy Artr	35		Orhy Artr
Pinyon-Juniper			35	T 3		35	T 3
5518 Dave Wood	215	2,140		Orhy Cemo	195		Orhy Cemo
Pinyon-Juniper			55	T 10		50	T 10
				Artr			Artr
Sagebrush			50	T 35		50	T 35

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5520 Lower Horsefly	965	5,710		Orhy Atco Cemo	1,105		Orhy Atco Cemo
Pinyon-Juniper			63	6 - 13		70	10 - 15
Saltbush			42	2 43 -		50	10 45 -
Sagebrush			53	4 28 -		60	10 35 -
5521 Highway 90	445	5,185		Orhy Atca	685		Orhy Atca
Pinyon-Juniper			50	2 2		65	10 10
5522 Beaver Hill	1,570	16,485		Orhy Atca	1,875		Orhy Atca
Pinyon-Juniper			50	5 5		60	10 10
5523 Horsefly	55	470		Kocr Cemo	40		Kocr Cemo
Pinyon-Juniper			36	7 3		32	7 3
5524 Duckett Draw	15	230		Hija Sihy Atca Artr	15		Hija Sihy Atca Artr
Pinyon-Juniper			45	- 16 - 27		45	- 16 - 27
Sagebrush			24	29 - T -		24	29 - T -
5525 Dry Creek	15	85		Spcr Artr	15		Spcr Artr
Pinyon-Juniper			35	10 10		35	10 10
Grass			20	20 -		20	20 -
5529 Log Hill	310	3,395		Orhy Amal	235		Orhy Amal
Pinyon-Juniper			75	5 5		60	5 5
Mountain Shrub			70	10 15		65	10 10
5530 Billy Creek	265	1,480		Hija Orhy Cemo Atco	240		Hija Orhy Cemo Atca
Pinyon-Juniper			46	5 T T -		45	5 T T -
Saltbush			42	- 5 - 33		40	- 5 - 33
Mountain Shrub			63	- T 2 -		55	- T 2 -
Sagebrush			45	5 5 - 10		40	5 5 - 10
Grass			60	5 10 2 2		55	5 10 2 2
5532 Burro Ridge	20	165		Orhy Artr	15		Orhy Artr
Pinyon-Juniper			45	T 10		40	T 5
Mountain Shrub			63	T 10		60	T 10
Sagebrush			45	5 30		40	5 25
5533 Onion Lakes	35	410		Brin Cemo	35		Brin Cemo
Mountain Shrub			63	3 2		63	3 2
Conifer			61	3 -		61	3 -
5534 Shin Park	300	510		Orhy Atco	185		Orhy Atco
Pinyon-Juniper			52	10 5		40	5 5
Saltbush			30	3 13		20	3 10
5535 Cedar Creek	10	30		Orhy Amal	10		Orhy Amal
Pinyon-Juniper			45	10 5 Atco		45	10 5 Atco
Saltbush			30	3 15		30	3 15
5536 South Canal	120	275		Orhy Atco	120		Orhy Atco
Saltbush			30	3 13		30	3 13
5538 Rock Ditch	5	5		Orhy Atco	5		Orhy Atco
Saltbush			30	3 13		30	3 13

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5540 Dry Gulch	930	4,050		Agsm Atca	900		Agsm Atca
Pinyon-Juniper			26	13 T		26	10 T
Mountain Shrub			60	15 T		50	15 T
Sagebrush			25	26 1		25	20 1
Broadleaf Trees			65	20 1		60	15 1
5542 Bosgal	5	5		Orhy Atco	5		Orhy Atco
Saltbush			20	10 30		20	10 30
5543 Waugh	10	25		Agsm Atco	10		Agsm Atco
Pinyon-Juniper			35	10 5		35	10 5
Saltbush			20	5 70		20	5 70
5544 Kelly	5	10		Agsm Atco	5		Agsm Atco
Saltbush			45	8 50		45	8 50
5545 Henshaw	15	20		Sihy Artr	15		Sihy Artr
Pinyon-Juniper			50	10 10		50	10 10
Sagebrush			48	10 30		48	10 30
5546 Waterdog Basin	45	290		Orhy Amal	40		Orhy Amal
Pinyon-Juniper			63	5 2 Artr		55	5 2 Artr
Sagebrush			45	10 25		45	10 20
5547 Slagle Pass	40	260		Brin Viam	40		Brin Viam
Conifer			61	5 11		61	5 11
5548 Washboard Rock	55	260		Orhy Amal	55		Orhy Amal
Mountain Shrub			55	10 15 Brin Viam		55	10 15 Brin Viam
Conifer			61	5 11 Feth		61	5 11 Feth
Grass			85	45 - Brin Agropyron		85	45 - Brin Agropyron
Broadleaf Trees			99	10 5		99	10 5
5549 High Park	110	650		Stco Artr	110		Stco Artr
Sagebrush			65	5 14		65	5 14
Barren			0	- - Brin Viam		0	- - Brin Viam
Conifer			61	5 11 Feth		61	5 11 Feth
Grass			87	24 -		87	24 -
5551 Dexter Creek	5	55		Orhy Amal	5		Orhy Amal
Mountain Shrub			50	5 10		50	5 10
5552 Dallas	15	200		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			45	2 24 Artr		45	2 24 Artr
Sagebrush			40	1 22		40	1 22

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5553 Fisher Creek	40	400		Agsm Cemo	35		Agsm Cemo
Pinyon-Juniper			45	T 20		40	T 15
				Arno			Arno
Mountain Shrub			59	5 20		55	5 15
5555 Taylor Draw	25	270		Sihy Amal	25		Sihy Amal
Pinyon-Juniper			64	3 3		64	3 3
5556 Burro Creek	10	100		Orhy Amal	10		Orhy Amal
Pinyon-Juniper			60	5 3		60	5 3
5557 Alkali	40	405		Orhy Cemo	35		Orhy Cemo
Pinyon-Juniper			55	5 10		50	5 8
Sagebrush			50	5 T		45	2 T
5559 South Fork	15	100		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			45	2 24		45	2 24
Sagebrush			45	5 10		45	5 10
5560 Cookie Tree	50	535		Orhy Cemo	45		Orhy Cemo
Pinyon-Juniper			45	2 20		40	2 15
Sagebrush			45	2 5		40	2 5
5561 East Fork	5	65		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			38	13 3		38	13 3
Mountain Shrub			45	5 3		45	5 3
5562 Hillside	10	135		Stco Amal	10		Stco Amal
Pinyon-Juniper			52	T 5		45	T 5
Mountain Shrub			60	1 10		55	1 10
Sagebrush			45	2 2		45	2 2
5563 Moonshine Park	10	175		Brin Amal	10		Brin Amal
Mountain Shrub			53	10 20		53	10 20
Conifer			65	5 5		65	5 5
Grass			73	35 -		73	35 -
Broadleaf Trees			97	18 5		97	18 5
5564 Gravel Pit	5	35		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			43	T 5		45	T 5
5565 Tommy Creek	20	100		Sihy Amal	20		Sihy Amal
Pinyon-Juniper			64	3 3		64	3 3
				Atco			Atco
Desert Shrub			45	10 20		45	10 20
				Amal			Amal
Mountain Shrub			71	8 10		71	8 10
5566 Cow Creek	105	435		Orhy Amal	105		Orhy Amal
Mountain Shrub			73	1 11		73	1 11
Conifer			70	1 3		70	1 3
Broadleaf Trees			80	T 2		80	T 2
5567 Busted Boiler	5	35		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			75	10 5		75	10 5

TABLE 2-38
PREDICTED FUTURE VEGETATIVE PRODUCTION, DENSITY AND COMPOSITION BY 2006 WITHOUT THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5568 Baldy	135	565		Stco Amal	135		Stco Amal
Mountain Shrub			52	T 5		52	T 5
				Brin			Brin
Conifer			60	5 2		60	5 2
Grass			55	20 -		55	20 -
5569 Hairpin	30	65		Orhy Cemo	25		Orhy Cemo
Sagebrush			54	4 4		45	4 4
5570 Cedar	375	1,770		Sihy Stco Agsm Amal	340		Sihy Stco Agsm Amal
Pinyon-Juniper			24	13 - T 4		20	10 - T 4
Mountain Shrub			33	2 T 2 2		30	2 T 2 2
Sagebrush			44	- 7 2 4		40	- 7 2 4
5572 McKenzie Creek	10	20		Orhy Cemo	10		Orhy Cemo
Pinyon-Juniper			61	8 3		61	8 3
5574 Tappan Creek	20	200		Sihy Artr	20		Sihy Artr
Pinyon-Juniper			31	3 68		31	3 68
TOTAL	51,315	323,880			50,345		

LIST OF KEY VEGETATIVE SPECIES
AND SCIENTIFIC ABBREVIATIONS

Species Abbreviation	Species Name	Common Name
GRASSES		
Agin	Agropyron intermedium	Intermediate wheatgrass
Agcr	Agropyron cristatum	Crested wheatgrass
Agsm	Agropyron smithii	Western wheatgrass
Agtr	Agropyron trachycaulum	Slender wheatgrass
Bogr	Bouteloua gracilis	Blue grama
Brin	Bromus inermis	Smooth brome
Feid	Festuca idahoensis	Idaho fescue
Feth	Festuca thurberi	Thurber fescue
Hija	Hilaria jamesii	Galleta grass
Kocr	Koeleria cristata	Junegrass
Orhy	Oryzopsis hymenoides	Indian ricegrass
Popr	Poa pratensis	Kentucky bluegrass
Pose	Poa secunda	Sandberg bluegrass
Sihy	Sitanion hystrix	Bottlebrush squirreltail
Spcr	Sporobolus cryptandrus	Sand dropseed
Stco	Stipa comata	Needle-and-thread
Stvi	Stipa viridula	Green needlegrass
FORBS		
Basa	Balsamorhiza sagittata	Arrowleaf balsamroot
Viam	Vicia americana	American vetch
SHRUBS		
Amal	Amelanchier alnifolia	Common serviceberry
Arno	Artemisia nova	Black sagebrush
Artr	Artemisia tridentata	Big sagebrush
Atca	Atriplex canescens	Fourwing saltbush
Atco	Atriplex confertifolia	Shadscale
Atcr	Atriplex corrugata	Mat saltbush
Atnu	Atriplex nuttalli	Nuttall saltbush
Cemo	Cercocarpus montanus	Mountain mahogany
Epvi	Ephedra viridis	Mormon tea
Pera	Peraphyllum ramosissimum	Squaw apple
Putr	Purshia tridentata	Bitterbrush
Syor	Symphoricarpos oreophilus	Mountain snowberry

Habitats in fair or poor condition would continue to decline. According to past rates of degradation, a 15 to 20 percent reduction from present conditions of these habitats might be expected during the next 28 years. Those habitats in good or excellent condition have been able to withstand present use rates and thus would continue to do so. They would remain in approximately their present state. (See table 2-39 for predicted future condition by stream and allotments.)

AMPs would be implemented either very slowly or not at all and provisions for decreasing sediment yield, removing grazing, or improving riparian and aquatic habitats incorporated into the AMPs would become much less effective.

The future aquatic and riparian habitats of the area without the proposed action would have 118.7 miles unchanged, 6.4 miles going from poor to nonexistent, 18.5 miles going from fair to poor, 17.2 miles going from good to fair and 20 miles going from excellent to good. This shows a net overall decline for 44.1 miles.

With the operation of Crystal Dam, the water temperature of the Gunnison River above the confluence of the Uncompahgre River will be lowered, and suitable trout habitat will be shifted downstream as far as Delta. Because of lowered water temperature, this habitat will become unsuitable for the endangered fish discussed under Aquatic and Riparian in the present environment section of this chapter.

The future aquatic environment of the Uncompahgre River will be altered by the USBR Dallas Creek Project. About 4.6 miles of poor stream fishery in the Uncompahgre River will be inundated by the Ridgway Reservoir. In about 12 miles of river below the reservoir the aquatic habitat will be improved by moderation of water fluctuations and water temperatures. Aquatic productivity is adequate and should increase with improved water quality and lowered sediment load. The fishery in the river will improve, and the USFWS has predicted an increase of 6,000 man-days of fishing for the segment from the dam downstream to the Montrose-Delta Canal. No fishery is predicted for the Ridgway Reservoir because of heavy metal pollution and low aquatic productivity due to turbidity.

Archeological Resources

In the year 2006, vandalism and weathering processes would continue to be the two major factors contributing to the loss of archeological values. It is doubtful that additional monies (purchase power) or staffing would be available to combat these factors on any notable level. The Federal Land Policy and Management Act of 1976 will provide BLM with more protective enforcement authority.

Visual Resources

By 2006 perhaps one-third of the livestock management facilities in the proposed action would be implemented. However, most of these facilities would not be noticeable from the main highway, unlike existing facilities. The chainings would be visible, but they would be designed to appear as natural openings in the tree canopy. Some of the existing chainings may be partially revegetated and less noticeable than they are today.

Recreation

USBR has two proposed reservoir development projects that will influence water-based recreation opportunities in the ES area. They are the Dallas Creek project on the Uncompahgre River near Ridgway and the Dominguez Dam project near Whitewater. The Dallas project will be located adjacent to allotments 5552 Dallas, 5553 Fisher Creek, 5555 Taylor Draw, 5556 Burro Creek, 5557 Alkali, 5559 South Fork, 5560 Cookie Tree, and 5565 Tommy Creek. Allotment 4001 Dominguez lies west of the proposed Dominguez reservoir.

Agriculture

Farming

No significant changes are expected for nongrazing agriculture by 2006. Water for irrigation is presently oversubscribed, and suitable privately owned land available for agricultural development exceeds water supplies. Seasonal fluctuation of land under cultivation is directly proportional to that season's runoff.

There are two irrigation projects in various stages of planning and execution which in some way will influence the area: the Grand Valley Unit project and the Dallas Creek project. Neither of these projects would use NRL for irrigation, Even upon completion of these water storage projects, irrigation water will still be overallocated.

The rest of NRL is for the most part not suitable for development for farming. This land is expected to remain in federal ownership because it is valuable for forage production and other uses.

TABLE 2-39
RIPARIAN HABITAT: PREDICTED FUTURE CONDITION WITHOUT PROPOSED ACTION
(BY STREAM AND ALLOTMENT)

Stream Name	Allotment No. & Name	NRL Miles	Present Condition a/	Predicted Condition in 2006 a/
Cottonwood (Escalante)	4007 Sawmill Mesa	2.2	Poor	Poor
	4008 25 Mesa	12.4	Poor	Poor
Little Dominguez	4001 Dominguez	13.0	Fair	Fair
East Fork Escalante	4026 Escalante Canyon	4.6	Fair	Fair
Escalante	4001 Dominguez	12.0	Fair	Poor
Gunnison (Black Canyon to Uncompahgre confluence)	*	15.0	Good	Good
Gunnison (Uncompahgre confluence to area border)	*	10.0	Fair	Fair
Monitor	4010 Monitor Mesa	3.8	Poor	Nonexistent
	4014 Joker	3.0	Poor	Poor
Potter	4010 Monitor Mesa	6.8	Nonexistent	Nonexistent
Roubideau				
Lower	4011 Lower Roubideau	2.1	Nonexistent	Nonexistent
Upper	4010 Monitor Mesa	4.9	Poor	Poor
	4012 Canal	2.6	Poor	Nonexistent
Beaton	5540 Dry Gulch	3.0	Nonexistent	Nonexistent
Billy	5530 Billy Creek	0	Excellent	Excellent
Chaffee	5530 Billy Creek	1.6	Nonexistent	Nonexistent
Cow	5566 Cow Creek	0.6	Good	Good
Dallas	None	0.8	Good	Good
Dolores	5520 Lower Horsefly	3.4	Excellent	Excellent
	5522 Beaver Hill	1.2	Excellent	Excellent
Dry	5507 Pipeline	3.4	Good	Good
	5513 Dry Creek Basin	5.6	Good	Fair
	5516 Piney	3.0	Good	Poor
Dry Cedar	5520 Lower Horsefly	2.1	Fair	Fair
Cedar	5569 Hairpin	2.2	Fair	Poor
McKenzie	5529 Log Hill	1.2	Fair	Fair
Happy Canyon	5522 Beaver Hill	4.6	Excellent	Excellent
Spring	5522 Beaver Hill	5.4	Good	Fair
Uncompahgre	*	1.8	Poor	Poor
Smith Fork	5022 Rabbit Gulch	2.4	Good	Fair
Bear	4517 Coal Gulch	3.0	Fair	Fair

a/ Condition class criteria for riparian habitats are given in footnote b/, table 2-27.
* Major rivers may cross many allotments. The effects of specific allotments on major rivers are insignificant when compared with the effects of the overall watershed.

TABLE 2-39
RIPARIAN HABITAT: PREDICTED FUTURE CONDITION WITHOUT PROPOSED ACTION
(BY STREAM AND ALLOTMENT) (Cont.)

Stream Name	Allotment No. & Name	NRL Miles	Present Condition a/	Predicted Condition in 2006 a/
Cottonwood (North Fork)	4517 Coal Gulch	1.2	Excellent	Excellent
Deep	4525 Anthracite Creek	0.6	Fair	Poor
North Fork Gunnison	4517 Coal Gulch	4.2	Fair	Fair
Hubbard	4516 North Fork	1.4	Fair	Fair
Leroux	4503 Stingley Gulch	0.5	Excellent	Good
	4504 Leroux Creek	1.0	Excellent	Good
Minnesota	4528 Oak Ridge	0.5	Excellent	Good
Muddy	4520 Spring Creek	2.6	Fair	Poor
West Muddy	4519 Muddy Creek	0.8	Fair	Poor
Terror	4513 Stevens Gulch	3.0	Good	Good
Williams	4525 Anthracite Creek	0.8	Good	Fair
Roatcap	4507 Jay Creek	1.6	Good	Good
	4511 Overland	0.4	Good	Good
	4513 Stevens Gulch	1.2	Good	Good
Currant	4502 Surface to Leroux	2.2	Good	Good
Anthracite	4548 Creek Bottom	0.3	Fair	Poor
Oak	4025 Ward Creek-Doughspoon	2.8	Fair	Fair
Summary of NRL Miles			12.4 Excellent	10.4 Excellent
			45.4 Good	30.2 Good
			60.8 Fair	56.5 Fair
			30.7 Poor	45.8 Poor
			13.5 Nonexistent	19.9 Nonexistent
			162.8 Total	162.8 Total

Livestock Grazing

Because AMPs will be implemented at a slower rate (about twenty AMPs implemented by 2006), it is likely that range conditions will continue to decline over the short run in some areas where deterioration is presently taking place. Where AMPs are implemented, the long-term trend will be toward improved forage conditions. In other areas where the present condition is stable or improving, no real changes are expected. Thus, by 2006 domestic livestock use of NRL is expected to be similar to existing licensed use.

Recent indicators suggest a leveling off in the number of beef cattle and calves and a reduced rate of decrease in the number of stock sheep and lambs. Some operators in the ES area are substituting cattle for sheep in their operations as a result of the difficulties associated with hiring capable herders and other economic problems.

U.S. Department of Agriculture studies project national increases of from 40 to 99 percent in the total demand for AUMs between 1970 and 2000. It is doubtful, however, that the range resources in the ES area could support increases much in excess of current inventory levels. (U.S. Department of the Interior 1975) Major livestock increases could come only at the expense of other agricultural activities, such as conversion of cropland back to rangeland or pasture. Improved management practices on all lands (private as well as public) would facilitate some increases. Improved economic conditions would also provide incentives to increase livestock numbers.

In summary, the number of beef cattle and calves is expected to remain at or slightly above current levels. Some cyclical reductions and expansions are expected in response to changing market and climatic conditions. The number of sheep and lambs will probably continue to decrease, but at rates below those in the recent past. Gradual exhaustion of fossil fuel reserves may increase the cost of artificial fibers, increasing wool prices and possibly reversing the downward trend in sheep numbers by the turn of the century. The net effect will be a moderate increase in the demand for AUMs as population growth and food needs continue to expand.

Land Use Plans, Controls, and Constraints

The local political attitude towards land use planning in the area ranges from complete commitment to complete avoidance. Ouray County is heavily commited and proud of its efforts, which include strict zoning and a start on an Economic Development Plan. Delta County is the other end of the scale. It has had no planner since the firing of the previous planner last July. Montrose County is between the two extremes, doing preliminary work on the Economic Development Plan, but having no zoning yet.

Region 10 Planning Commission is performing a coordination job by providing training and skills unavailable on the county level. A recently published draft of suggested future goals and objectives for Region 10 suggested that the commission serve and assist, implement recommendations of an Economic Development Program, influence legislation, increase input into other planning and decision making processes, coordinate human resource agencies, monitor water quality plans, and participate in federal grants when qualified and entitled.

The future for land use planning looks reasonably bright. The steps being taken are on a county level, not on a regional level. The Region 10 Planning Commission will continue to provide coordination and assistance as requested.

Transportation Network

The transportation network in the ES area is expected to remain essentially unchanged through 2006.

Socio-Economic Conditions

Population

The declining population trend of the past decade (1960 to 1970) for the three-county ES area has been reversed, and population is expected to increase to between 40,670 and 54,483 by the year 2006. This estimate represents an increase over the 1970 population level of 16 to 55 percent, with the expectation being that the population level will be closer to the high estimate.

Although the ES area population will continue to increase, it is expected to be a declining proportion of both Region 10 and Colorado population. Region 10 population is expected to increase to between 55,116 and 73,554 by the year 2006, which represents an increase of 23 to 64 percent of the 1970 population level. Colorado population could increase between 43 and 111 percent, with the high estimate on population expansion for the year 2006 being 4,654,668.

Income

Income levels in the ES area are expected to continue to increase due to economic growth in the region. However, they will probably continue to remain below the state average. Major developments in mining of fossil fuels could bring about substantial change as could continued expansion of the manufacturing sector. If recent trends continue, income levels will move closer to state averages. Total area income for the year 2006 is not estimated since such factors as inflation, population levels, and future economic activity are subject to substantial variation.

Employment

It is expected that scenic and recreational attractions of the area, its attractiveness as a place to live, and expansion of the mining and manufacturing sectors will combine to present a favorable employment situation for the future. Employment relative to these activities should increase also, bringing about increased employment in service sectors.

Social Well-Being

Though the well-being of people in the ES area has been improving and will continue to improve, it is not expected that their social well-being will equal that of the state population in general in the foreseeable future.

Public Finance and Tax Base

There should be an expansion of the tax base as a result of economic activity projected for the ES area. If assessed valuation increases more rapidly than population, but mill levies remain relatively constant, per capita revenue available to fund support facilities and services will be increased. Even though the area may improve its funding capabilities, it is not expected to reach the higher levels of per capita revenue associated with the state as a whole.

Socio-Cultural Attitudes

Without a major influx of new people, ES area values and attitudes are expected to change only slightly. Gradual changes will occur as education, television, and other communication systems expose area residents to the predominantly urban values and attitudes of the nation. However, other national trends suggest that a strengthening of "older" traditional values is occurring, which could counter this exposure to urban values and attitudes.

Some change could be expected as a result of projected economic activity. If rapid development of fossil fuel resources occurs, there could be enough of an immigration of people to cause some change in socio-cultural values and attitudes.

Although some change is expected, it appears that values and attitudes are less likely to be affected by grazing management considerations than by other socio-cultural variables.

CHAPTER 3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

ASSUMPTIONS AND ANALYSIS GUIDELINES

1. The demand for meat production will increase in future years.

2. The proposed action or alternative allotment management plans (AMPs) will be implemented over the eight-year period following completion of the final environmental statement (ES).

3. The Bureau of Land Management (BLM) will fund the improvements required to implement the proposed action and do so within the stated time frame.

4. The necessary manpower will be furnished by and to the Uncompahgre Basin Resource Area (ES area), and rigorous effort will be made to completely carry out the studies and monitoring program recommended in the AMPs (see chapter 4).

5. The proposed range improvements will disturb approximately 29,970 acres over the short term (eight years) and approximately 25 acres over the long term (twenty years) as shown in table 3-1.

6. The proposed range improvements will cost a total of approximately $1,788,164 to construct, over a period of seven years. They will cost a total of approximately $65,290 per year thereafter to maintain. See table 3-2.

7. In addition to the improvements described in the proposed action, the existing improvements, as listed in table 3-3, will be maintained in serviceable condition.

IMPACTS

Each impact is analyzed in a cause and effect manner, and secondary impacts are identified and traced to the extent they can no longer be identified with the proposed action. Each cause identified is tied to a component of the environment (chapter 2). Existing environmental data were used to assess temporary or short-term impacts, while both existing data and estimated future changes in the existing environment were used to assess permanent or long-term impacts.

Unless otherwise stated in the narrative, short-term means eight years or less (eight years being the period of implementation), and long-term means at least an additional twenty years after complete implementation (2006).

The proposed action is predicted to have no significant impacts on geology, topography, climate, air quality, or transportation networks.

Soils

The following section briefly discusses the impacts of the proposed action on soil loss.

Hydrologic soil groups and their related soil infiltration rates, as described in chapter 2, were used in the adaptation of a simulation model (developed by Gifford, Hawkins, and Williams 1975) to predict hydrologic changes resulting from the implementation of grazing management on national resource lands (NRL) in the ES area. The methodology and analysis is continued in this chapter under Water Resources.

Under normal storm events, it has been determined that there would be no change in runoff and sediment yield on allotments with proposed AMPs (479,265 acres). However, as stated under Water Resources, with the implementation of a grazing plan there would be a decrease in runoff and sediment yield with the larger storm (50-year/24-hour) as compared with not implementing a grazing plan. The magnitude of these changes could not be determined, but the decrease in soil loss would affect the soils. No data or methods were available to predict the kinds or magnitude of the changes which would occur within the soils.

No changes in runoff, peak discharge, or sediment yield are identified in the water resources section in conjunction with trailing (480 acres), custodial management (29,460 acres), elimination of grazing (3,020 acres), and unallotted land (13,550 acres). With no changes in runoff and sediment yield, there would be no increased soil loss and therefore no change in the soil.

Table 3-4 shows the comparison between the present erosion condition class (soil surface factor, SSF) by allotment and that which is expected twenty years after complete implementation of the proposed action (2006). The change in erosion condition from the present to the future is an estimate made by the writer of each AMP; it is a professional determination based on past experience in similar situations.

By comparing the changes which would occur on each AMP (which, as previously stated, were determined by professional experience) with similar situations, the percent changes in erosion condition classes were determined to be as follows. Under the present condition, 6 percent of the allotment acreage is in the stable erosion condition class; 45 percent is in the slight class; 43

TABLE 3-1
EXPECTED ACRES DISTURBED BY PROPOSED RANGE IMPROVEMENTS

Range Improvement	Unit	Total	Acres Disturbed per Unit		Total Acres Disturbed	
			Short-term a/	Long-term b/	Short-term a/	Long-term b/
WATER DEVELOPMENTS						
Vertical Wells	No.	18	0.2	0.2	3.5	3.5
Horizontal Wells	No.	1	0.1	-	0.1	-
Springs	No.	29	0.2	0.2	6.0	6.0
Catchments	No.	1	1.0	0.5	1.0	0.5
Reservoirs	No.	86	1.0	0.1	86.0	8.5
Pipelines	Mi.	139	0.2	-	28.0	-
Water Taps	No.	4	0.03	-	0.1	-
Storage Tanks	No.	23	0.2	0.2	4.5	4.5
Water Troughs	No.	300	0.1	0.001	30.0	0.3
FENCES						
Fences	Mi.	180	1.0	0.002	180.0	0.4
Corrals	No.	1	0.5	0.5	0.5	0.5
Boundary Markers	No.	112	0.1	-	11.0	-
OTHER PROJECTS						
Cattleguards	No.	12	0.1	0.004	1.0	0.05
Stock Trails	Mi.	6	1.5	-	9.0	-
Stock Bridges	No.	1	0.1	0.1	0.1	0.1
VEGETATION CONVERSIONS						
Chainings & Seedings	Ac.	20,880	1.0	-	20,880.0	-
Interseedings	Ac.	8,665	1.0	-	8,665.0	-
Contour Furrows	Ac.	1,250	0.05	-	65.0	-
TOTALS					29,970.8	24.35

a/ Short-term means at least eight years from the present, which covers the period of implementation.
b/ Long-term means at least twenty years after full implementation or twenty-eight years from the present (i.e., 2006).

TABLE 3-2

SUMMARY OF PROPOSED IMPROVEMENTS, ESTIMATED CONSTRUCTION COSTS, AND ANNUAL MAINTENANCE COSTS

Projects & Vegetation Conversions	Unit	No. of Improvements & Estimated Construction Costs by Year of Occurence a/b/														Total	All Years a/	Maintenance Rate (% of Initial Costs)	Total Annual Maintenance Costs a/
		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7					
		No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars		
WATER DEVELOPMENTS																			
Wells	No.	10	136,400	5	99,800	-	-	4	45,600	-	-	-	-	-	-	19	281,800	3	8,454
Springs	No.	19	15,200	2	1,600	2	1,600	2	1,600	4	3,200	-	-	-	-	29	23,200	6	1,392
Catchments	No.	-	-	1	16,000	-	-	-	-	-	-	-	-	-	-	1	16,000	4	640
Reservoirs	No.	24	24,000	21	21,000	18	18,000	16	16,000	4	4,000	3	3,000	-	-	86	86,000	5	4,300
Pipelines	Mi.	39	97,500	33.5	83,750	27	67,500	11	17,500	28.5	69,250	-	-	-	-	139	335,500	10	33,550
Water Taps	No.	-	-	2	2,000	-	-	-	-	2	1,000	-	-	-	-	4	3,000	2	60
Storage Tanks	No.	4	12,000	5	15,000	8	24,000	1	3,000	3	9,000	-	-	2	4,000	23	67,000	2.5	1,675
Water Troughs	No.	106	21,200	69	13,800	51	10,200	33	6,600	39	7,800	-	-	2	400	300	60,000	10	6,000
FENCES																			
New (wire)	Mi.	1.5	3,600	48	115,200	24.5	58,800	29	69,600	44	106,080	14	31,200	19	45,600	180	430,080	2	8,602
Corrals	No.	-	-	1	2,000	-	-	-	-	-	-	-	-	-	-	1	2,000	5	100
Boundary Markers	No.	23	115	31	155	58	290	-	-	-	-	-	-	-	-	112	560	-	-
OTHER PROJECTS																			
Cattleguards	No.	4	5,600	4	5,800	1	1,400	2	3,000	1	1,400	-	-	-	-	12	17,200	2	334
Trails	Mi.	-	-	-	-	3	2,750	1.55	775	1.45	625	-	-	-	-	6	4,150	2	83
Stock Bridges	No.	-	-	-	-	1	2,000	-	-	-	-	-	-	-	-	1	2,000	5	100
VEGETATION CONVERSIONS																			
Chainings & Seedings	Ac.	3,255	49,140	-	-	800	12,000	3,835	66,700	900	13,500	10,330	143,350	1,760	29,625	20,880	314,315	-	-
Interseedings	Ac.	3,215	39,384	-	-	-	-	825	10,106	400	4,900	2,555	31,311	1,670	20,458	8,665	106,159	-	-
Contour Furrows	Ac.	-	-	-	-	-	-	430	10,700	-	-	-	-	820	28,500	1,250	39,200	-	-
TOTALS			404,139		376,105		198,540		251,181		220,755		208,861		128,583		1,788,164		65,290
Income Effects on Local Households c/			80,828		75,221		39,708		50,236		44,151		41,772		25,717		357,633		19,587

a/ All monetary calculations on this table were rounded to the nearest dollar.
b/ Construction of range improvements would be completed by the end of the seventh year after implementation of the proposed action.
c/ Estimated at 20 percent of initial construction costs and 30 percent of maintenance costs.

TABLE 3-3
EXISTING IMPROVEMENTS TO BE MAINTAINED
UNDER THE PROPOSED ACTION

Range Improvement	Unit	Total
WATER DEVELOPMENTS		
Wells	No.	1
Catchments	No.	10
Reservoirs	No.	225
Pipelines	Mi.	2.2
FENCES		
Fences	Mi.	131.7
Corrals	No.	9
Exclosures	No.	11
ROADS AND TRAILS		
Stock Trails	Mi.	66.2
Roads & Truck Trails	Mi.	95.2
OTHER PROJECTS		
Cattleguards	No.	9
VEGETATION CONVERSION AND WATER RETENTION		
Chainings	Ac.	22,401
Seedings	Ac.	8,079
Contour Furrows & Check Dams	Ac.	13,606
Sagebrush Spraying	Ac.	1,240

Source: Bureau of Land Management, Automated Data Processing System 1977.

TABLE 3-4
PRESENT AND FUTURE EROSION CONDITION CLASSES BY ALLOTMENT

Allotment No. & Name	Acres NRL	Present Erosion Condition Classes					Future Erosion Condition Classes (by 2006)				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)	Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
4001 Dominguez	58,335	-	35,615	22,720	-	-	35,615	22,720	-	-	-
4002 Lower Escalante	2,240	-	-	2,240	-	-	-	2,240	-	-	-
4005 Fall Cabin	360	-	180	180	-	-	180	180	-	-	-
4006 Dry Mesa	18,895	-	18,895	-	-	-	-	18,895	-	-	-
4007 Sawmill Mesa	12,095	-	-	12,095	-	-	-	12,095	-	-	-
4008 25 Mesa	10,405	-	-	10,405	-	-	-	10,405	-	-	-
4010 Monitor Mesa	15,735	-	11,615	4,120	-	-	-	15,735	-	-	-
4011 Lower Roubideau Canyon	480	-	-	480	-	-	-	-	480	-	-
4012 Canal	10,650	-	10,650	-	-	-	-	10,650	-	-	-
4013 Ben Lowe	5,490	-	-	5,490	-	-	-	-	5,490	-	-
4014 Joker	1,835	-	1,400	435	-	-	-	1,400	435	-	-
4015 White Ranch	415	-	415	-	-	-	-	415	-	-	-
4016 Wells Gulch	16,955	-	-	16,955	-	-	-	16,955	-	-	-
4017 Alkali Flats	27,830	-	1,010	26,820	-	-	-	27,830	-	-	-
4021 Point Creek	1,000	-	-	1,000	-	-	-	1,000	-	-	-
4022 Petrie Mesa	13,860	-	-	9,680	4,180	-	-	13,860	-	-	-
4024 Dirty George	2,385	-	385	2,000	-	-	-	2,385	-	-	-
4025 Ward Creek-Doughspoon	17,910	-	16,710	1,200	-	-	5,400	12,510	-	-	-
4026 Escalante Canyon	1,270	-	210	1,060	-	-	210	1,060	-	-	-
4501 Milk Creek	105	105	-	-	-	-	105	-	-	-	-
4502 Surface to Leroux	3,230	-	3,230	-	-	-	-	3,230	-	-	-
4503 Stingley Gulch	1,080	-	1,080	-	-	-	930	150	-	-	-
4504 Leroux Creek	2,555	-	-	2,555	-	-	555	2,000	-	-	-
4505 Juniper Knob	120	-	120	-	-	-	-	120	-	-	-
4506 Oak Mesa	1,350	-	530	220	600	-	-	1,350	-	-	-
4507 Jay Creek	9,205	-	1,620	7,585	-	-	1,620	7,585	-	-	-
4509 Upper Jay Creek	430	-	430	-	-	-	430	-	-	-	-
4511 Overland	160	-	160	-	-	-	-	160	-	-	-
4512 East Roatcap	30	-	30	-	-	-	30	-	-	-	-
4513 Stevens Gulch	6,555	-	2,285	2,535	1,735	-	2,285	4,270	-	-	-
4514 Upper Terror Creek	30	30	-	-	-	-	30	-	-	-	-
4515 Freeman Gulch	620	620	-	-	-	-	620	-	-	-	-
4516 North Fork	23,420	-	23,420	-	-	-	3,000	20,420	-	-	-
4517 Coal Gulch	7,720	7,720	-	-	-	-	7,720	-	-	-	-
4518 Pilot Creek	45	45	-	-	-	-	45	-	-	-	-
4519 Muddy Creek	500	500	-	-	-	-	500	-	-	-	-
4520 Spring Creek	120	120	-	-	-	-	120	-	-	-	-

TABLE 3-4
PRESENT AND FUTURE EROSION CONDITION CLASSES BY ALLOTMENT (cont.)

Allotment No. & Name	Acres NRL	Present Erosion Condition Classes					Future Erosion Condition Classes (by 2006)				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)	Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
4521 Stock Driveway	120	-	120	-	-	-	-	120	-	-	-
4522 Downing	120	120	-	-	-	-	120	-	-	-	-
4523 Williams Creek	110	110	-	-	-	-	110	-	-	-	-
4524 Deep Creek	160	160	-	-	-	-	160	-	-	-	-
4525 Anthracite Creek	1,115	-	615	500	-	-	1,115	-	-	-	-
4526 Crystal Creek	480	480	-	-	-	-	480	-	-	-	-
4527 Jumbo Mountain	4,970	-	995	3,975	-	-	1,000	3,970	-	-	-
4528 Oak Ridge	3,600	-	3,370	230	-	-	-	3,600	-	-	-
4529 Reynolds Creek	1,200	-	-	1,200	-	-	-	1,200	-	-	-
4530 North Fork South	3,185	-	2,305	880	-	-	-	3,185	-	-	-
4531 Popp Ranch	265	-	265	-	-	-	-	265	-	-	-
4532 McDonald Ranch	7,330	-	2,760	4,570	-	-	-	7,330	-	-	-
4535 Home Place	160	-	-	-	160	-	-	160	-	-	-
4536 West Young's Peak	160	-	-	-	160	-	-	160	-	-	-
4537 Young's Peak	2,520	-	-	2,520	-	-	-	2,520	-	-	-
4538 Missouri Flats	120	-	120	-	-	-	-	120	-	-	-
4539 Cottonwood Creek	120	-	120	-	-	-	-	120	-	-	-
4540 North Saddle Peak	240	-	-	240	-	-	-	240	-	-	-
4541 Sunshine Mesa	40	-	-	40	-	-	-	-	40	-	-
4543 South Saddle Peak	220	220	-	-	-	-	220	-	-	-	-
4548 Creek Bottom	185	185	-	-	-	-	185	-	-	-	-
4549 Dry Creek	3,110	-	3,110	-	-	-	-	3,110	-	-	-
5002 Dedication Site	1,915	-	1,915	-	-	-	-	1,915	-	-	-
5003 Selig Canal	7,665	-	-	-	7,665	-	-	-	7,665	-	-
5008 Brush Point	18,205	-	1,125	12,905	4,175	-	1,125	12,905	4,175	-	-
5010 Dead Horse	955	860	95	-	-	-	955	-	-	-	-
5011 Gould Reservoir	2,825	-	2,825	-	-	-	2,825	-	-	-	-
5012 Cedar Point	620	-	620	-	-	-	-	-	620	-	-
5013 Iron Canyon	1,335	1,175	160	-	-	-	1,335	-	-	-	-
5014 Poison Springs	1,570	-	1,275	295	-	-	1,275	295	-	-	-
5015 Grizzly Gulch	1,930	-	1,930	-	-	-	1,930	-	-	-	-
5016 Black Canyon	440	-	-	440	-	-	-	-	440	-	-
5017 Green Mountain	20,825	-	10,490	10,335	-	-	20,825	-	-	-	-
5020 Black Ridge	6,875	-	-	6,875	-	-	6,875	-	-	-	-
5022 Rabbit Gulch	1,250	-	560	690	-	-	-	1,250	-	-	-
5025 Fruitland Mesa	80	-	-	80	-	-	-	-	80	-	-
5026 Star Nelson Airport	80	-	80	-	-	-	-	80	-	-	-
5027 Adobe	300	-	300	-	-	-	-	300	-	-	-

TABLE 3-4
PRESENT AND FUTURE EROSION CONDITION CLASSES BY ALLOTMENT (cont.)

Allotment No. & Name	Acres NRL	Present Erosion Condition Classes					Future Erosion Condition Classes (by 2006)				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)	Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
5028 Doug Creek	400	400	-	-	-	-	400	-	-	-	-
5029 Spring Gulch	1,430	1,430	-	-	-	-	1,430	-	-	-	-
5030 Bostwick Park	5,495	2,065	-	-	-	3,430	2,065	-	-	3,430	-
5033 Pinyon Springs	1,030	1,030	-	-	-	-	1,030	-	-	-	-
5036 Big Gulch	40	-	40	-	-	-	-	40	-	-	-
5037 Black Mesa	500	-	500	-	-	-	-	500	-	-	-
5038 Red Canyon	80	-	-	80	-	-	-	-	80	-	-
5039 Onion Valley	40	40	-	-	-	-	40	-	-	-	-
5040 Pine Ridge	80	-	80	-	-	-	-	80	-	-	-
5041 East Gould Reservoir	620	-	620	-	-	-	-	620	-	-	-
5043 Collins	200	-	200	-	-	-	-	200	-	-	-
5044 Big Pasture	200	-	200	-	-	-	-	200	-	-	-
5045 Black Bullet	90	-	-	90	-	-	-	-	90	-	-
5046 Big Gulch	440	-	440	-	-	-	-	440	-	-	-
5047 Mesa Creek	640	640	-	-	-	-	640	-	-	-	-
5048 Morrow Point	1,035	1,035	-	-	-	-	1,035	-	-	-	-
5049 Smith Fork	450	-	-	450	-	-	-	450	-	-	-
5050 Allen Reservoir	200	-	200	-	-	-	200	-	-	-	-
5502 Sandy Wash	7,530	-	490	7,040	-	-	490	7,040	-	-	-
5503 Green	450	-	-	450	-	-	-	450	-	-	-
5504 Roatcap	3,070	-	-	3,070	-	-	-	3,070	-	-	-
5505 Transfer	2,970	-	1,200	1,770	-	-	1,200	1,770	-	-	-
5507 Pipeline	19,190	-	15,705	-	3,485	-	15,705	3,485	-	-	-
5508 Government Springs	2,260	-	2,260	-	-	-	500	1,760	-	-	-
5509 Coal Creek	320	320	-	-	-	-	320	-	-	-	-
5510 Bald Hills	205	205	-	-	-	-	205	-	-	-	-
5511 Shavano Mesa	2,015	500	1,515	-	-	-	500	1,515	-	-	-
5512 Franklin Mesa	3,600	3,600	-	-	-	-	3,600	-	-	-	-
5513 Dry Creek Basin	5,425	-	5,425	-	-	-	-	5,425	-	-	-
5514 East Fork Dry Creek	135	-	-	135	-	-	-	-	135	-	-
5515 Olathe Reservoir	185	-	-	185	-	-	-	-	185	-	-
5516 Piney	8,335	-	2,860	5,475	-	-	-	-	8,335	-	-
5517 Spring Creek Canyon	440	440	-	-	-	-	440	-	-	-	-
5518 Dave Wood	2,565	-	835	1,730	-	-	-	2,565	-	-	-
5520 Lower Horsefly	10,365	-	1,710	2,575	6,080	-	1,710	-	8,655	-	-

TABLE 3-4
PRESENT AND FUTURE EROSION CONDITION CLASSES BY ALLOTMENT (cont.)

Allotment No. & Name	Acres NRL	Present Erosion Condition Classes					Future Erosion Condition Classes (by 2006)				
		Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)	Stable (Acres)	Slight (Acres)	Moderate (Acres)	Critical (Acres)	Severe (Acres)
5521 Highway 90	6,215	-	-	6,215	-	-	-	6,215	-	-	-
5522 Beaver Hill	19,785	-	9,893	9,892	-	-	-	19,785	-	-	-
5523 Horsefly	640	-	640	-	-	-	640	-	-	-	-
5524 Duckett Draw	275	-	-	275	-	-	-	-	275	-	-
5525 Dry Creek	100	100	-	-	-	-	100	-	-	-	-
5529 Log Hill	4,345	-	4,345	-	-	-	-	4,345	-	-	-
5530 Billy Creek	3,995	-	3,995	-	-	-	-	3,995	-	-	-
5532 Burro Ridge	200	-	-	200	-	-	-	200	-	-	-
5533 Onion Lakes	630	-	630	-	-	-	-	630	-	-	-
5534 Shin Park	3,970	3,970	-	-	-	-	3,970	-	-	-	-
5535 Cedar Creek	240	-	240	-	-	-	-	240	-	-	-
5536 South Canal	2,115	-	2,115	-	-	-	-	2,115	-	-	-
5538 Rock Ditch	55	-	55	-	-	-	-	55	-	-	-
5540 Dry Gulch	4,860	-	2,420	2,440	-	-	-	4,860	-	-	-
5542 Bosgal	50	-	50	-	-	-	-	50	-	-	-
5543 Waugh	200	-	200	-	-	-	-	200	-	-	-
5544 Kelly	80	-	80	-	-	-	-	80	-	-	-
5545 Henshaw	170	-	-	170	-	-	-	-	170	-	-
5546 Waterdog Basin	400	-	400	-	-	-	-	400	-	-	-
5547 Slagle Pass	310	310	-	-	-	-	310	-	-	-	-
5548 Washboard Rock	760	760	-	-	-	-	760	-	-	-	-
5549 High Park	1,660	1,660	-	-	-	-	1,660	-	-	-	-
5551 Dexter Creek	65	65	-	-	-	-	65	-	-	-	-
5552 Dallas	240	-	240	-	-	-	-	240	-	-	-
5553 Fisher Creek	480	-	480	-	-	-	-	480	-	-	-
5555 Taylor Draw	325	-	325	-	-	-	-	325	-	-	-
5556 Burro Creek	120	-	120	-	-	-	-	120	-	-	-
5557 Alkali	485	-	485	-	-	-	-	485	-	-	-
5559 South Fork	120	-	120	-	-	-	-	120	-	-	-
5560 Cookie Tree	640	-	640	-	-	-	-	640	-	-	-
5561 East Fork	80	-	-	-	80	-	-	-	-	80	-
5562 Hillside	160	-	-	160	-	-	-	160	-	-	-
5563 Moonshine Park	230	-	230	-	-	-	-	230	-	-	-
5564 Gravel Pit	40	-	-	40	-	-	-	-	40	-	-
5565 Tommy Creek	120	-	120	-	-	-	-	120	-	-	-
5566 Cow Creek	520	520	-	-	-	-	520	-	-	-	-
5567 Busted Boiler	40	40	-	-	-	-	40	-	-	-	-
5568 Baldy	680	680	-	-	-	-	680	-	-	-	-
5569 Hairpin	500	-	500	-	-	-	-	500	-	-	-
5570 Cedar	2,125	-	2,125	-	-	-	-	2,125	-	-	-
5572 McKenzie Creek	110	-	110	-	-	-	-	110	-	-	-
5574 Tappan Creek	240	-	240	-	-	-	-	240	-	-	-
Unallotted Lands	13,550	-	6,775	6,775	-	-	-	6,775	6,775	-	-
TOTALS	525,775	32,260	236,998	224,767	28,320	3,430	140,185	337,915	44,165	3,510	-

percent is in the moderate class; 5 percent is in the critical class; and 1 percent is in the severe class. By 2006, 27 percent of the acres under the proposed action would be in the stable erosion condition class; 64 percent would be in the slight class; 8 percent would be in the moderate class; and 1 percent would be in the critical class. The net result would be a 21 percent increase in acres occurring in the stable erosion condition class; a 39 percent increase in acres in the slight class; a 35 percent decrease in acres in the moderate class; a 4 percent decrease in acres in the critical class; and a 1 percent decrease in acres in the severe class.

Summary

With an anticipated decrease in runoff and sediment yield from large storms under the proposed action, soil changes would occur, but no data are available to identify the kinds or magnitude. There would be no quantifiable change in soils except for the changes in erosion condition classes summarized in table 3-4. This improvement in erosion class is the result of a predicted improved vegetative cover.

Water Resources

The following section briefly discusses the methodology used in evaluating the changes in runoff and sediment yield (for a more detailed discussion of methodology, see appendix 3). These changes are then discussed in light of their impacts on surface water, ground water, and the quality of each.

Hydrologic Impacts of AMPs

For this ES, an adaptation of a simulation model developed by Gifford, Hawkins, and Williams (1975) was used to predict hydrologic changes resulting from the implementation of AMPs on NRL in the ES area. Each AMP that fell within a representative watershed (see map 2-4) was broken down by pasture and analyzed for changes in infiltration rates according to the equations presented in figure 3-1 and the proposed grazing system (the pasture-level analysis is available from the Montrose District Office). "Heavy grazing", under a rotation scheme, was defined as all livestock being confined to a single pasture for any given length of time, and "moderate" grazing was defined as the livestock being spread over more than one pasture. All infiltration rates were affected under either heavy or moderate use regardless of length of grazing period (e.g., heavy grazing for two months equals heavy grazing for six months). "Recovery" between grazing periods was calculated assuming a linear, four year recovery time to some speculative pre-grazing status. The equation to represent this is $f_r = f + (f_o - f)t/T$ (inches per hour) where f_r is the rate at the end of the recovery period, f_o is the pre-grazing optimum rate defined by the hydrologic soil group, f is the beginning rate, t is the rest time in years, and T is the recovery time in years (in this case, four years). The limit of $t/T \leq 1$.

Winter grazing was assumed to have no effect on hydrologic properties (Ponce et al. 1975), and predicted vegetative cover densities outlined in the AMPs (and as analyzed in Vegetation) were used in predicting hydrologic changes. Discrepancies between BLM Watershed Conservation and Development System Phase I data and present cover conditions presented in the AMPs resulted in adjustments to projected cover densities presented in some of the AMPs. These densities play an important role in estimating runoff, and apparent overestimates in Phase I data may have caused underestimates of runoff for the present and future situations. These underestimates could also cause inaccurate estimates of percent change in runoff and peak discharge between present and future conditions.

Impacts on Surface Water and Erosion

Grazing management under the AMPs would have no detectable impact on the overall water supply of the Gunnison River basin (table 2-5) in conjunction with a rainfall event with less than a 50-year return period. There is only a 40 percent chance of a 50-year rainfall or runoff event occurring during the 20-year period of consideration. Even if such an event were to occur during that period on any given watershed, the resulting runoff would only be decreased by approximately 30 percent from NRL. Runoff from private and Forest Service (USFS) land, which for most watersheds is in the majority, would not be changed. However, the grazing may have impacts on a local basis in conjunction with larger storms with less than a 50-year return period. (Table 3-5 shows infiltration rates, runoff, and peak discharge for the nine representative watersheds 20 years after implementation of AMPs.)

In general, soils with low initial infiltration rates and spring or summer grazing during any portion of the grazing cycle would have an increase in infiltration (384,447 acres). (Note: There are areas that have both fall-winter and spring-summer grazing so the acreage figures in this and the next paragraph are not additive.) The predicted increases depend on the validity of the regression equations at low infiltration rates presented by Gifford, Hawkins, and Williams (1975) (figure 3-1). A possible reason for the increase is the breaking up of the crust created by raindrop splash on salt crusts. Soils with low initial infiltration rates subjected to only fall or winter grazing would have no overall change in infiltration rate (441,542 acres).

However, soils with relatively high initial rates would have a net decrease, probably due to compaction during spring and summer grazing (40,408 acres). This net decrease would be outweighed by the increases in vegetative cover which would result in a net improvement in hydrologic condition, or runoff curve number (U.S. Department of Agriculture, Soil Conservation Service, 1972).

The result would be a net decline in runoff volumes and peak discharges, on all AMPs for extreme storm events (table 3-5). The changes mentioned above would result in reduced erosion from these watersheds for large storms (50-year/24-hour). The amount of reduction in sediment yields has not been quantified. A search of the literature (including BLM Manuals) has revealed no reasonable model that can be used with the available data to determine the changes which would occur.

The present water supply along with the proposed catchments and spring developments should provide adequate water for livestock since there are no increases in numbers proposed, only changes in utilization patterns. The availability of water does, however, depend on weather patterns, which cannot be predicted with a high degree of certainty.

The installation of range improvement—even with the design features described in chapter 1 as part of the proposed action—would result in a net short-term increase in sediment yield of 880 tons, as shown in table 3-6. However, this impact would be insignificant, since the soil loss would be scattered throughout the entire ES area and would be spread out over the eight years of implementation.

CHAINING AND SEEDING

Approximately 20,880 acres of pinyon-juniper are proposed for chaining. Very little data are presently available as to the watershed characteristics or hydrologic properties of the areas proposed for chaining. Chaining, however, is known to basically change plant cover and soil surface, and Gifford (1975) has recently provided an in-depth review of the impacts of pinyon-juniper manipulation on watershed values. Based upon that review, the following generalized impacts are expected from this proposed range improvement.

Infiltration rates would not be significantly affected by chaining, particularly on the sandier soils.

Water yield increases should not be expected. Sites with greater basal area pinyon-juniper are more likely to produce slightly more runoff due to chaining.

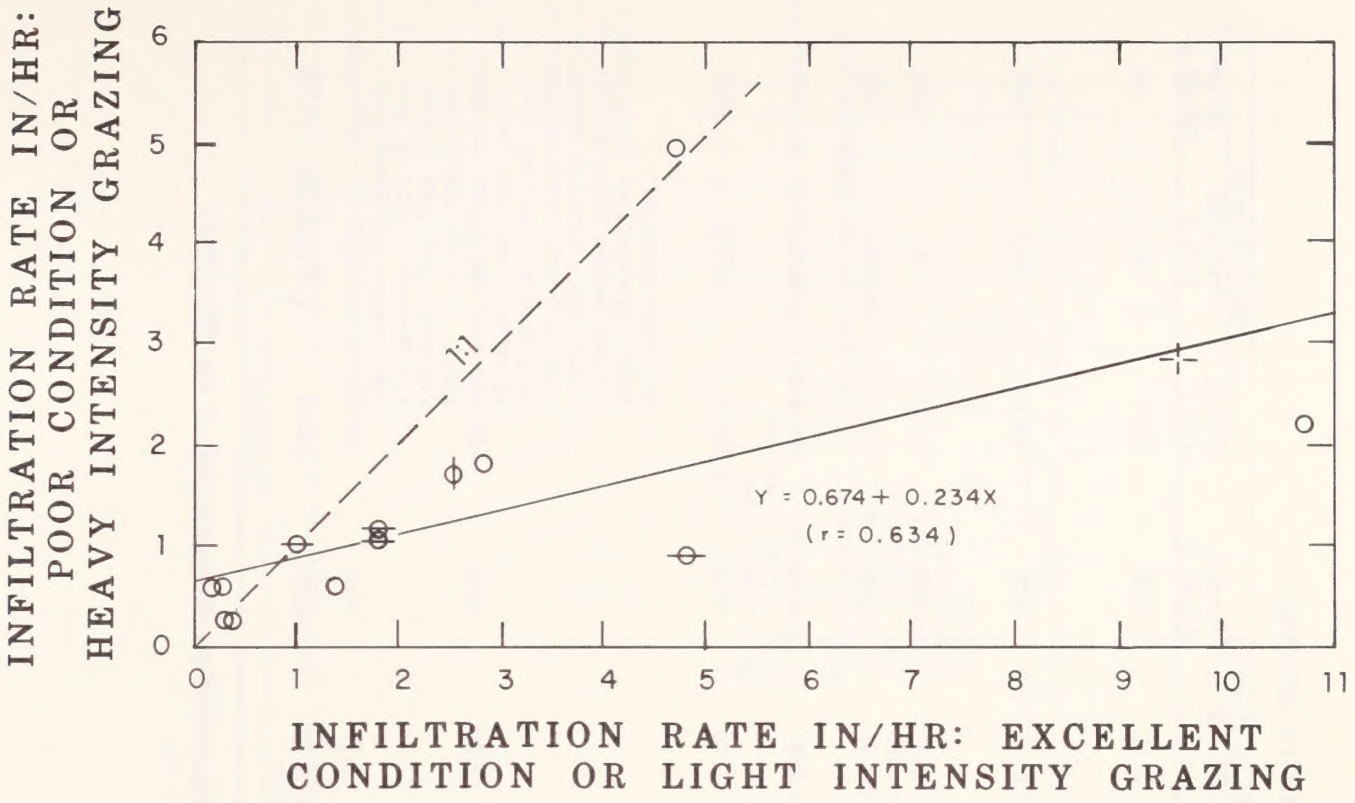
Past studies would indicate no likely increases in sediment discharge.

The effect of seeding following pinyon-juniper chaining is difficult to assess because of its linkage with the chaining. Should seeding be successful, the additional plant cover would improve the hydrologic condition of the land. (Past experience in the ES area has shown that seedling establishment has been 100 percent successful with fall seeding.) A resultant improvement in vegetative cover would have favorable hydrologic consequences.

CONTOUR FURROWING

The immediate short-term impact of contour furrowing on 1,250 acres would be to provide additional depression storage of approximately 5 centimeters (1.9 inches) of runoff (Branson, Miller, and McQueen 1966). The same authors have shown (see figure 3-2) that precipitation storage is a decay function of time, such that storage capacity decreases rapidly during the first five years to less than 2.5 centimeters (1 inch), and thereafter tends to stabilize at about 1.2 centimeters (0.47 inch) after nine or more years.

Thus, it would appear that contour furrowing, where applied in this ES area, would for the first three years after construction provide sufficient depression storage to retard the 3-centimeter (1.2-inch) maximum runoff expected from the 50-year, 24-hour duration storm. Were such a severe storm to occur after three years, as will surely happen


INFILTRATION RATE IN/HR: POOR CONDITION OR HEAVY INTENSITY GRAZING
1:1
Y = 0.674 + 0.234X
(r = 0.634)
INFILTRATION RATE IN/HR: EXCELLENT CONDITION OR LIGHT INTENSITY GRAZING

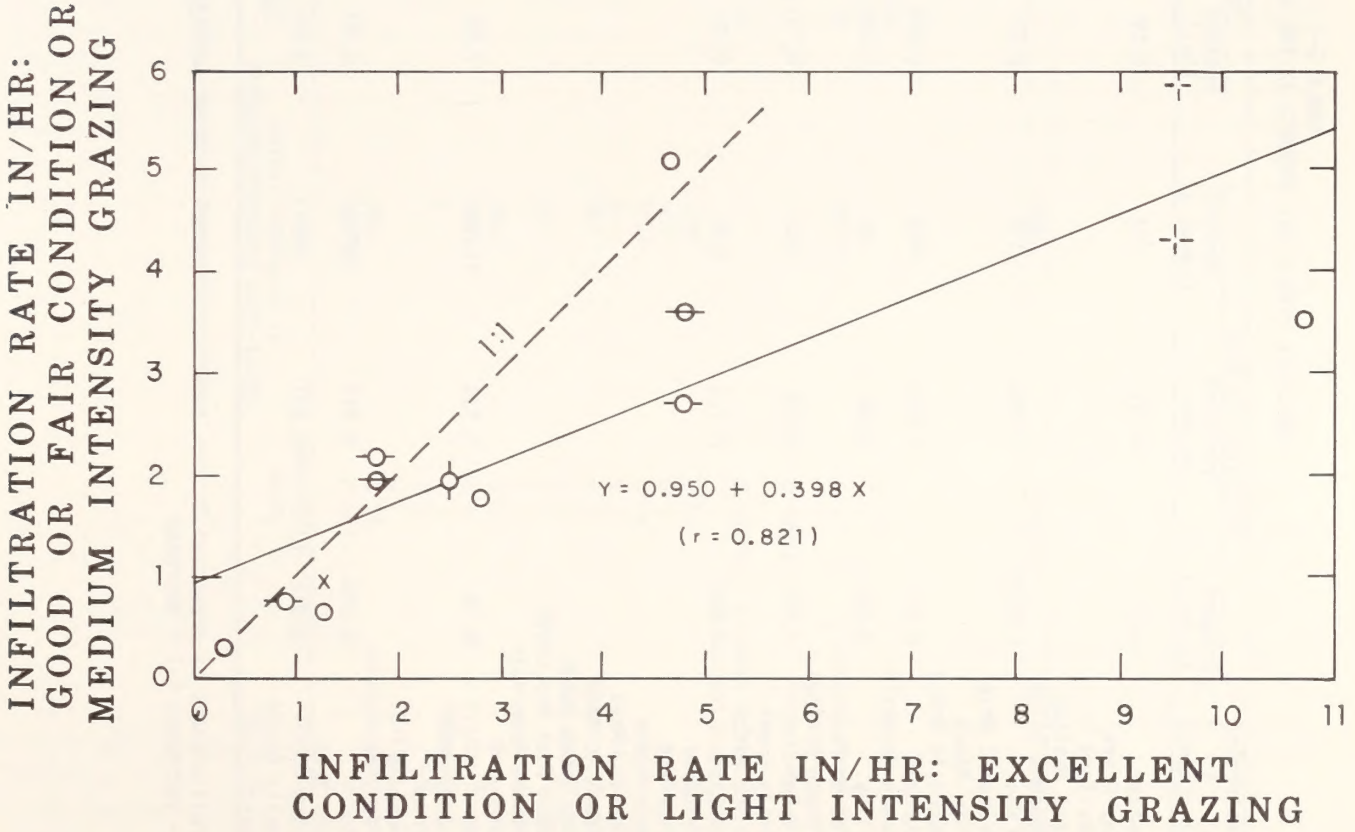

INFILTRATION RATE IN/HR: GOOD OR FAIR CONDITION OR MEDIUM INTENSITY GRAZING
1:1
Y = 0.950 + 0.398 X
(r = 0.821)
INFILTRATION RATE IN/HR: EXCELLENT CONDITION OR LIGHT INTENSITY GRAZING

Figure 3-1. Changes in infiltration rates when changing from light to moderate grazing intensities (Source: Gifford et al, 1975)

TABLE 3-5
PREDICTED HYDROLOGIC CHANGES IN THE REPRESENTATIVE WATERSHEDS

Watershed & Allotments	Infiltration Rate			Runoff (50-yr./24-hr.)			Peak Discharge		
	Present (in./hr.)	Predicted (in./hr.)	Percent Change a/	Present (in.)	Predicted (in.)	Percent Change a/	Present (cfs.)	Predicted (cfs.)	Percent Change a/
Upper Roatcap	0.93	0.943	+1%	0.19	0.15	-21%	85.0	80.0	-6%
4507 Jay Creek									
4511 Overland									
4512 East Roatcap									
4513 Stevens Gulch									
McDonald Mesa	1.0425	0.9024	-13%	0.21	0.1	-52%	65.2	30.0	-54%
4530 McDonald Mesa									
4531 Popp Ranch									
4532 McDonald Ranch									
Green Mountain	0.512	0.824	+60%	0.075	0.015	-80%	10.0	0	-100%
5017 Green Mountain									
Peach Valley	0.897	0.86	-4%	0.51	0.35	-31%	912.0	404.0	-56%
4022 Petrie Mesa									
5033 Pinyon Springs									
Chaffee Gulch	0.662	0.828	+25%	0.7	0.51	-27%	665.0	304.0	-54%
5530 Billy Creek									
5532 Burro Ridge									
Dry Creek Basin	0.554	0.713	+29%	0.30	0.20	-33%	1,060.0	490.0	-54%
5505 Transfer									
5507 Pipeline									
5510 Bald Hills									
5511 Shavano Mesa									
5512 Franklin Mesa									
5513 Dry Creek Basin									
5514 East Fork Dry Creek									
5515 Olathe Reservoir									
5516 Piney									
Big Sandy	0.25	0.534	+114%	0.65	0.38	-42%	545.0	187.0	-66%
5502 Sandy Wash									
5503 Green									
5504 Roatcap									
5507 Pipeline									
Dry Mesa	0.653	0.817	+25%	0.30	0.17	-43%	99.0	45.0	-55%
4006 Dry Mesa									
Wells Gulch	0.912	0.931	+2%	0.80	0.72	-10%	1,200.0	1,075.0	-10%
4016 Wells Gulch									
4516 North Fork									

Note: Full effects as presented in this table are expected to occur twenty years after complete implementation of the AMPs (2006).
a/ (+) = increase; (-) = decrease

TABLE 3-6

SHORT-TERM IMPACTS OF PROPOSED RANGE IMPROVEMENTS ON SEDIMENT YIELDS

Improvement	Acres Disturbed	Short-Term Increase/Decrease in Sediment Yields (tons)	Comments		
			Infiltration Rates	Runoff	Assumptions
Fences	180.0	+3,600			Calculations for all improvements except vegetative conversions assume: (1) uppermost limit of very high yield sediment class from Sediment Yield Map (Colo. Land Use Commission 1974), (2) sediment yield from disturbed areas of at least 3 acre feet per mile per year or 8 tons per acre per year, (3) equal rate of ground cover increases for 4 years, (4) 4 years to establish sufficient ground cover to stablize the area. Calculations use Universal Soil Loss Equation.
Boundary Markers	11.0	+220			
Cattleguards	1.0	-			
Corrals	0.5	-			
Stockbridges	0.1	-			
Stock Trails	9.0	+180			
Pipelines	28.0	+560			
Water Taps	0.1	-			
Wells	3.5	+70			
Horizontal Well	0.1	-			
Storage Tanks	4.5	+90			
Catchments	1.0	+20			
Reservoirs	86.0	+435			
Springs	6.0	+120			
Troughs	30.0	+610			
Vegetative Conversion:					
Chaining & Seeding	20,880.0	-	No change.	No increase from high-intensity storms.	
Interseeding	8,665.0	-	Little change.	Little change.	Negligible surface, soil disturbance.
Contour Furrows	65.0	-5,025	No effect on infiltration between furrows.	Reduce velocity of surface runoff. Store sediment yielded from between furrows.	Calculations use Universal Soil Loss Equation.
TOTALS	29,970.8	+880			

eventually, the furrows would not retard all of the 3-centimeter (1.2-inch) runoff because of the sedimentation which would gradually fill in the furrows to a minimum storage of 1 to 2 centimeters (0.4 to 0.8 inch).

The sediment yield impacts of contour furrowing can be assessed by evaluating the work of Thomas (1975), who found that the effective sediment storage varied 22 to 84 metric tons per hectare (9.8 to 37.5 tons per acre), well over the estimated sediment yield Class III established by the Pacific Southwest Inter-Agency Committee, a methodology task force studying factors affecting sediment yield (Colorado Land Use Commission 1974). Again, however, sediment trapping efficiency would decline in the same manner as precipitation storage.

Vegetative growth may be enhanced in the furrows due to the additional stored moisture (see vegetation section).

INTERSEEDING

No literature could be found to aid in characterizing the hydrologic impacts of interseeding. However, the hydrologic condition of the 8,665 acres proposed for interseeding is expected to improve. Logically, increased cover would reduce raindrop impact and increase infiltration rates, resulting in decreased runoff and sediment yield. However, portions of the additional forage produced by interseeding would be utilized for grazing, which would minimize the beneficial hydrologic effects.

OTHER RANGE IMPROVEMENTS

None of the other range improvement projects proposed in chapter 1 would modify watershed surface to any significant degree. The water development projects (wells, rainfall catchments, earthen reservoirs, springs) would not involve development, utilization, or evaporative loss from any significant portion of the total water supply cycling through the hydrologic subsystem of the ES area.

Impacts on Ground Water

Since there is no significant change in runoff for a normal rainfall event and since the average hourly rate of snowmelt would be expected to be considerably less than the minimum soil infiltration rates of 0.25 inch per hour (Schultz 1973), impacts of grazing on ground water recharge would be insignificant during a normal year. Decreases in runoff for large storms would reduce the amount of water recharging into the alluvial deposits along the stream channels.

Increased infiltration rates should increase the water available for recharge in the upper reaches of the watersheds where grazing occurs. However, the extent to which this additional recharge potential is overcome by higher rates of evapotranspiration created by additional plant cover is not known.

Surface Water Quality

The long-term impact of grazing on chemical water quality is not known; however, there should be no change in water quality on an average year-to-year basis, based on the previously described analysis.

Very slight decreases in overland flow velocities may occur during intense thunderstorms. Therefore, changes in sheet erosion are not expected for a normal storm. Rill erosion would decrease during extreme events (50-year storm or greater), but below levels of detection.

Since decreases in peak discharges would be anticipated for extreme storm events, some decrease in channel erosion would occur. (The magnitude and extent of channel erosion is dependent upon channel stability, and the decrease would vary from channel to channel depending upon changes taking place within each individual AMP.) It is possible that, in the long term, the hydrologic effects computed here could result in channel aggradation (filling with fluvial deposits), thus reducing channel hydraulic capacity.

For extreme storm events, reduced sediment yield could result in decreased salt loading of the area streams and rivers, provided that the commonly held assumption that the direct relationship between sediment yield and salt loading can be applied to the area.

Chemical water quality response to pinyon-juniper chaining should be no problem. Should site and storm characteristics combine to produce a significant runoff event, elements likely to be yielded in resultant stormflow are phosphorus and potassium.

Ground Water Quality

The impacts of grazing on ground water quality are not known. However, the natural quality of ground water is influenced mainly by local geology and is not expected to show measurable differences due to grazing management practices. In

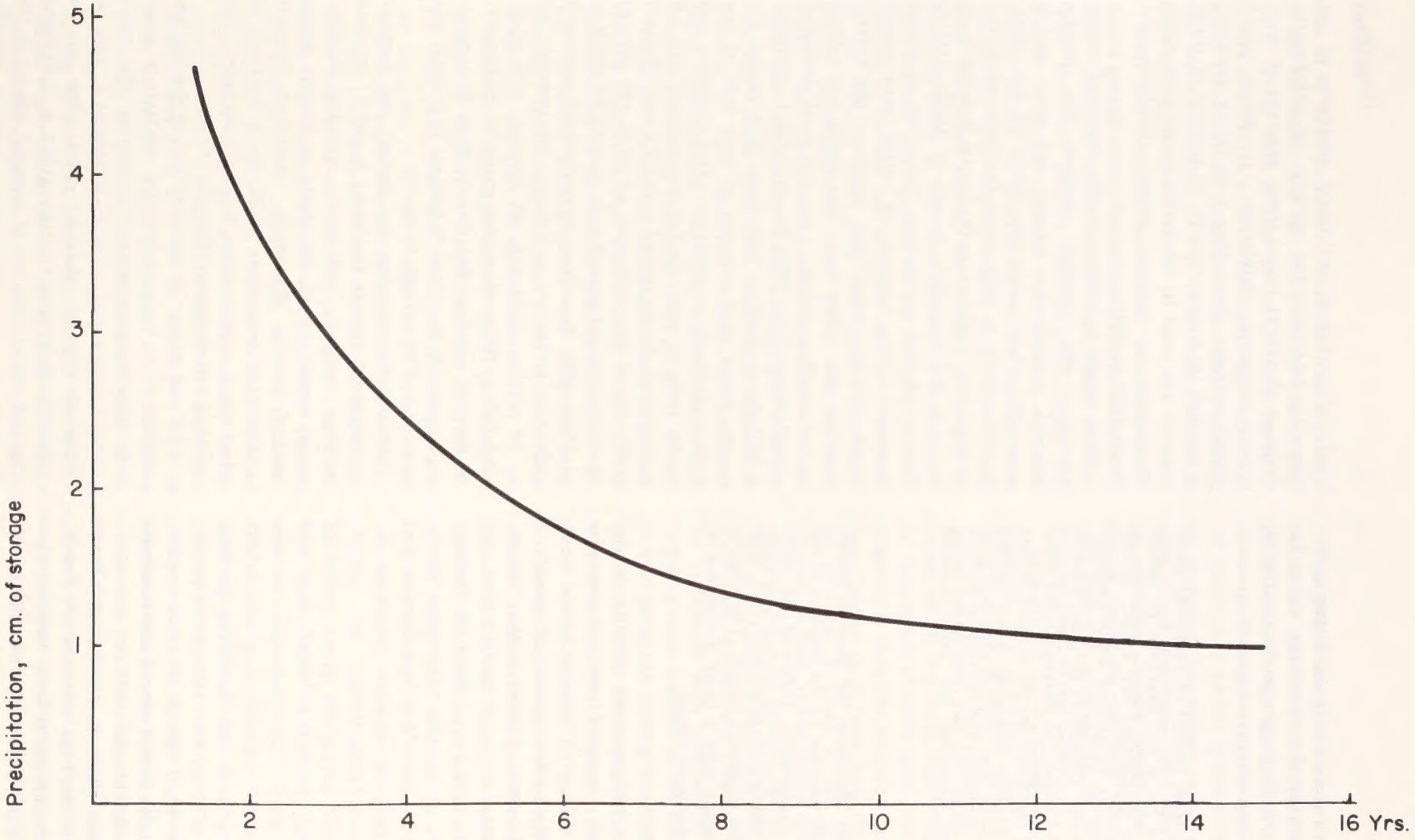


Figure 3-2

Decrease in water storage of Model B contour furrows as a function of time. Note the rapid decline in storage during the first five years. (From: Branson, Miller and McQueen, 1966.)

addition, the large volumes of ground water coupled with slow movement and mixing would be expected to buffer any changes in the quality of ground water due to grazing management.

Summary

The overall long-term impact of proposed grazing systems would be a net decrease in runoff volumes and peak discharges for larger storms (see table 3-5). Impacts on ground water recharge would be insignificant. Decreases in sheet erosion and channel erosion would be immeasurable from year to year, and decreases in rill erosion would be undetectable. Average chemical water quality would not change annually, but salinity of surface water runoff may decrease for large rainfall events.

Vegetation

This section first discusses the general principles of plant growth relevant to the impacts of the proposed grazing treatments, followed by allotment specific summaries of short-term and long-term impacts of the proposed action. The vegetation section concludes with a brief discussion of the impacts on endangered plants.

Grazing Management

Proposed grazing management of NRL in the ES area includes systems which prescribe livestock grazing during all seasons of the year. Estimations of vegetative impacts are based on professional judgment and cited studies which, although not conducted within the ES area, are believed applicable to the area since the findings discuss the results of meeting basic plant needs. Providing for plant needs for reproduction and establishment results in similar responses regardless of location (Marten 1975).

Grazing any time during the green period of plants reduces the amount of food made and stored by the plants. This reduction in turn decreases the plants' capacity to produce both shoot and root growth the following growing season (Hormay 1970, p. 14). This green period, which varies from plant species to plant species, in the ES area begins in mid-March and continues into September (refer to table 1-7).

Hormay indicates (1970, p. 14) that defoliation is most harmful when food reserves are lowest, which occurs in the spring or early summer when the plant is most rapidly growing or any time until food storage is completed. Similarly, using fall levels of carbohydrates (food reserves) as an index to determine the severity of defoliation, Cook et al. (1971) found these reserves at their lowest following defoliation (1) during rapid growth periods, about May 1 or (2) at maturity, about July 1. Approximately 75 percent of these reserves are used in the spring to produce some 10 percent of herbage growth (Stoddart and Smith 1955, p. 101).

With regard to browse plants, continual spring browsing will severely deplete the plant's reserves, reproductive growth, and vigor, and it eventually could cause the death of the plant. Garrison (1972, p. 276) states that removal of the terminal bud will activate the lateral dormant buds but that this vegetative growth is detrimental to flower and fruit production. Therefore, an actual decrease in the amount of viable seed would occur, causing fewer new plants in the future. Garrison also states that "late spring and middle of the growing season... are the most damaging periods of use" (p. 278). Browse plants completely defoliated three or four times in a season are readily killed, and removal of only half of the foliage markedly weakens the plant (Stoddart and Smith 1955, p. 104). As for late summer and fall browsing of shrubs typical to the ES area Sheperd (1971) found that utilization of 80 to 100 percent of current annual growth each year could result in plant die-offs. However, recommended sustained utilization levels are as follows: serviceberry, up to 60 percent; oakbrush, 60 percent, with occasional 80 to 100 percent use; mountain mahogany, 70 percent; antelope bitterbrush, 20 to 40 percent; big sagebrush, less than 50 percent in summer and in excess of 50 percent in winter.

Allotments receiving any spring and summer grazing (rest rotation treatment A and B, deferred rotation, trailing, and some custodial management) would subject the plants to grazing during critical periods. Therefore, short-term impacts under these treatments would be a decrease in plant vigor, reproduction, litter accumulation, and seedling establishment (Hormay, 1970).

Fall and winter or dormant season grazing are considered to be least harmful methods of grazing. Grazing management employing this treatment includes rest rotation treatment C and D, deferred rotation, deferred, and some of the custodial allotments. Garrison (1972, p. 278) found that fall and winter use of selected species is the least damaging to carbohydrate reserves. Defolia-

tion of 50 to 60 percent of a current year's growth is less harmful in the fall, early or late winter, and early spring than in late spring or early summer (Cook et al. 1971, p. 51). These grazing treatments allow for increased reproduction, seed trampling, and vigor (Hormay, 1970 p. 18), while decreasing litter accumulation.

With the exception of those custodial allotments grazed during the critical period, each allotment (484,590 acres) would have rest periods from livestock grazing (defoliation) during the critical growing period. The amount of rest needed would be determined by the species that needed the most rest to regain vigor after it had been defoliated during the critical green period (Hormay 1970, p. 16). The amount of rest necessary for the key species in the ES area is considered to be one full growing season. A pasture in the 484,590 acre area will receive this rest period approximately once every two to four years. This professional determination is based upon past experience with existing AMPs in the area and similar situations. Short-term vegetation impacts of this treatment would be increased vigor, reproduction, seedling establishment, and litter accumulation (Hormay 1970, p. 18).

Table 3-7 shows the short-term impacts on terrestrial vegetation that would occur with the implementation of the various grazing systems, trailing, custodial management, and elimination of grazing. Short-term impacts listed in the table would last one year for each treatment.

Short-term impacts which may result in a decline in vegetative condition over part of the ES area each year due to critical period grazing are expected to be more than offset by the other short-term impacts resulting from periods of rest.

Long-term impacts would result from the cumulative effects of the short-term impacts by 2006. Table 3-8 compares predicted long-term vegetative production in animal unit months (AUMs), vegetative density, and percent composition of key species with the present and potential by allotment. Table 3-9 identifies expected range condition changes by 2006 for the vegetative types in each allotment. Each allotment was considered according to present range condition and trend, production, time frame, and proposed grazing system to establish allotment specific future estimates. For a discussion of the general methodology used for range condition and predicted production changes refer to appendix 4.

The proposed rest rotation systems on 404,300 acres are expected to have these long-term impacts: plant responses of improved vigor, increased litter accumulation, and increased number of established plants (vegetative density) as well as increased percentage composition of key species. These individual plant responses could result in increased forage production. Similar impacts would occur for deferred rotation (23,600 acres) and deferred grazing (51,365 acres) in the study area as listed in the tables.

A study by L. H. Douglas (1915) showed, for example, that a 19-acre study area, grazed after seed maturity in 1911 and 1912, had 100 percent more vegetation per unit area than the outside range which had been moderately grazed May 10 to September 15 each year, and 20 percent more vegetation than the one-acre area which had not been grazed at all from June 1911 to August 1913. In addition, a study at the Sonora Experiment Station in west Texas (Keng and Merrill 1960) indicated that a 25 percent increase in range condition and forage production was obtained from a four-pasture, deferred rotation system of grazing as compared with continuous yearlong grazing with the same number of livestock.

The proposed trailing use (on 480 acres) is expected to allow for reproduction, seed trampling, and seedling establishment, which should allow more annual production by 2006.

Custodial grazing units totalling 29,460 acres should continue with present trends. As shown in the tables, where the trend is upward, production, vegetative density, and key species composition would increase by 2006.

Elimination of grazing on nine allotments (3,020 acres) should allow increased vigor, litter accumulation, and reproduction for individual plants. However, in a study by McLean and Tisdale (1972) in British Columbia in rough fescue and ponderosa pine zones, it took up to 40 years for range in poor condition to recover to good when protected from livestock grazing. The recovery from fair to good condition was more rapid (about 20 years). Little change in plant composition took place inside the exclosures in less than 10 years following fencing. This study took place in an annual precipitation zone of about 25 inches, in rough fescue and pine-bunchgrass vegetative types. Most of the ES area, including the allotments proposed for elimination of grazing, is in annual precipitation zones around 8 to 10 inches.

TABLE 3-7
PREDICTED SHORT-TERM IMPACTS ON VEGETATION

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4006 Dry Mesa:	5511 Shavano Mesa	Rest Rotation--Two Treatments (14,655 acres):	
A Escalante Subunit	5512 Franklin Mesa		
4506 Oak Mesa:	5569 Hairpin	Utilize forage in fall or winter.	Litter accumulation reduced. Seed trampling increased.
G Subunit 1			
5003 Selig Canal:		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
S Selig Canal Subunit			
4503 Stingley Gulch		Rest Rotation--Two Treatments (10,395 acres):	
4516 North Fork:			
K South-of-Hotchkiss Subunit		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
L Hubbard Subunit		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Allows some seedling establishment.
5521 Highway 90			
4010 Monitor Mesa	4527 Jumbo Mountain	Rest Rotation--Three Treatments (197,530 acres):	
4013 Ben Lowe	4528 Oak Ridge		
4016 Wells Gulch	5008 Brush Point	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
4022 Petrie Mesa	5010 Dead Horse		
E Peach Valley Subunit	5011 Gould Reservoir	Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4024 Dirty George	5013 Iron Canyon		
4025 Ward Creek-Doughspoon	5014 Poison Spring		
	5015 Grizzly Gulch	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4506 Oak Mesa:	5017 Green Mountain		
H Subunit 2	5020 Black Ridge		
4513 Stevens Gulch:	5028 Doug Creek		
I Roatcap Creek Subunit	5030 Bostwick Park		
	U Black Canyon-Jones Draw Subunit		
J Terror Creek Subunit			
4516 North Fork:	5507 Pipeline		
M Deer Basin Subunit	5529 Log Hill		
4517 Coal Gulch	5530 Billy Creek		

a/ Short-term impacts on vegetation would last one to three years.

TABLE 3-7
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name	Grazing Systems	Short-Term Impacts of Grazing Systems a/
4012 Canal 4504 Leroux Creek 4507 Jay Creek	Rest Rotation--Four Treatments (22,410 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
4001 Dominguez 4006 Dry Mesa: B Dry Mesa Subunit 4017 Alkali Flats 4021 Point Creek 4525 Anthracite Creek 4537 Young's Peak: Q Young's Peak Subunit 5502 Sandy Wash 5503 Green 5504 Roatcap 5508 Government Springs 5520 Lower Horsefly: X Lower Horsefly Subunit 5522 Beaver Hill 5523 Horsefly 5540 Dry Gulch	Rest Rotation--Four Treatments (150,975 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
	Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5516 Piney	Rest Rotation--Five Treatments (8,335 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.

TABLE 3-7
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4502 Surface to Leroux 4529 Reynolds Creek 4530 McDonald Mesa 4532 McDonald Ranch: N Lambing Shed Subunit 4540 North Saddle Peak 4549 Dry Creek	5016 Black Canyon 5029 Spring Gulch 5030 Bostwick Park: V Adobe South Subunit 5570 Cedar	Deferred Rotation (23,080 acres): Utilize forage in spring. Defer grazing one growing season, and utilize forage in fall.	 Vigor, reproduction, and litter accumulation reduced. Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5566 Cow Creek		Deferred Rotation (520 acres): Utilize forage in spring. Defer grazing one growing season, and utilize forage in fall. Utilize forage in summer.	 Vigor, reproduction, and litter accumulation reduced. Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased. Vigor, reproduction, and litter accumulation reduced.
4002 Lower Escalante 4007 Sawmill Mesa 4008 25 Mesa 4022 Petrie Mesa F Petrie Mesa Subunit 4532 McDonald Ranch: O South-of-Town Subunit P Harrington Subunit 5049 Smith Fork	5505 Transfer 5513 Dry Creek Basin 5518 Dave Wood 5520 Lower Horsefly: Y Dry Cedar 5532 Burro Ridge 5534 Shin Park 5562 Hillside 5568 Baldy	Deferred (51,365 acres): Defer grazing during growing season, and utilize forage in fall or winter each year.	 Defer: Vigor, reproduction and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4011 Lower Roubideau		Trailing (480 acres): Utilize forage spring and fall each year.	 Vigor, reproduction, and litter accumulation reduced. Seed trample increased and seedling establishment reduced.

TABLE 3-7
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4026 Escalante Canyon	5533 Onion Lakes	Custodial (6,815 acres):	
4501 Milk Creek	5536 South Canal		
4514 Upper Terror Creek	5538 Rock Ditch	Utilize forage in fall and/or	Litter accumulation reduced. Vigor, reproduction,
4535 Home Place	5542 Bosgal	winter.	and seed trampling increased.
5022 Rabbit Gulch	5543 Waugh		
5026 Star Nelson	5544 Kelly		
Airport	5545 Henshaw		
5036 Big Gulch	5547 Slagle Pass		
5045 Black Bullet	5564 Gravel Pit		
5525 Dry Creek	5567 Busted Boiler		
4005 Fall Cabin	4541 Sunshine Mesa	Custodial (22,645 acres):	
4006 Dry Mesa:	4543 South Saddle		
C Smith Ranch Subunit	Peak	Utilize forage season-long,	Vigor, reproduction, and litter accumulation reduced.
D Escalante Creek	4548 Creek Bottom	spring and fall, or most of	(Some seed trample where fall use occurs.) Seedling
Subunit	5002 Dedication Site	the growing season.	establishment reduced.
4014 Joker	5003 Selig Canal:		
4015 White Ranch	T Rawhide-Coffeepot		
4505 Juniper Knob	Subunit		
4509 Upper Jay Creek	5012 Cedar Point		
4511 Overland	5025 Fruitland Mesa		
4512 East Roatcap	5027 Adobe		
4515 Freeman Gulch	5030 Bostwick Park:	5509 Coal Creek	
4518 Pilot Creek	W Bostwick Park	5510 Bald Hills	
4519 Muddy Creek	Subunit	5514 East Fork Dry Creek	
4520 Spring Creek	5033 Pinyon Springs	5515 Olathe Reservoir	
4521 Stock Driveway	5038 Red Canyon	5517 Spring Creek Canyon	
4522 Downing	5039 Onion Valley	5524 Duckett Draw	
4523 Williams Creek	5040 Pine Ridge	5535 Cedar Creek	
4524 Deep Creek	5041 East Gould	5546 Waterdog Basin	
4526 Crystal Creek	Reservoir	5548 Washboard Rock	
4531 Popp Ranch	5043 Collins	5549 High Park	
4536 West Young's Peak	5044 Big Pasture	5551 Dexter Creek	
4537 Young's Peak:	5046 Big Gulch	5561 East Fork	
R Crawford Subunit	5047 Mesa Creek	5563 Moonshine Park	
4538 Missouri Flats	5048 Morrow Point	5565 Tommy Creek	
4539 Cottonwood Creek	5050 Allen Reservoir	5574 Tappan Creek	
5037 Black Mesa	5557 Alkali	Elimination of grazing (3,020 acres):	
5552 Dallas	5559 South Fork		
5553 Fisher Creek	5560 Cookie Tree	No livestock grazing.	Vigor, reproduction, and litter accumulation increased.
5555 Taylor Draw	5572 McKenzie Creek		Seedling establishment allowed.
5556 Burro Creek			

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
4001 Dominguez	5,600	41,020		Hija	Atca			7,250		Hija	Atca		
Pinyon-Juniper			55	1	2				70	10	5		
Saltbush			12	2	5				15	5	10		
Desert Shrub			12	2	5				15	5	10		
Sagebrush			51	1	2				60	10	5		
4002 Lower Escalante	335	1,665		Orhy	Atca			375		Orhy	Atca		
Pinyon-Juniper			50	10	1				55	10	10		
Saltbush			36	5	1				40	10	15		
Desert Shrub			15	T	-				20	5	-		
Sagebrush			24	T	-				30	5	-		
4005 Fall Cabin	40	300		Sihy	Epvi			40		Sihy	Epvi		
Pinyon-Juniper			34	6	3				34	6	3		
4006 Dry Mesa	1,185	14,160		Orhy	Atca	Artemisia		1,585		Orhy	Atca	Artemisia	
Pinyon-Juniper			70	5	-	30			80	10	-	35	
Saltbush			50	10	20	20			55	15	25	22	
Sagebrush			50	5	T	40			55	10	10	40	
4007 Sawmill Mesa	790	9,170		Hija	Kocr	Atca	Arno	1,210		Hija	Kocr	Atca	Arno
Pinyon-Juniper			45	22	3	3	7		60	25	10	5	10
Saltbush			19	84	-	11	-		30	84	-	15	-
Sagebrush			24	42	-	-	17		40	42	-	-	20
4008 25 Mesa	810	6,630		Hija	Atca	Spcr		985		Hija	Atca	Spcr	
Pinyon-Juniper			32	21	4	-			40	25	10	-	
Saltbush			36	25	10	-			45	25	15	-	
Broadleaf Trees			67	-	3	33			70	-	3	33	

Note: Present production, vegetative density, and species composition are based on Bureau of Land Management, Uncompahgre Basin Resource Area, unit resource analyses and allotment management plans. For a discussion of methodology and data base for current, potential, and predicted future production levels, refer to appendix 4. Potential production is based on two reports by the Soil Conservation Service: Paonia Soil Survey Report and Ridgway Soil Survey Report. Future vegetative production, density, and composition are estimated for twenty years after full implementation of the proposal (i.e., 2006).

a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.

b/ Vegetative density as defined in the glossary is presented as a representative number for the whole type.

c/ "T" = trace. "-" = not a key species in that type in that allotment. "0" = no trace of this key species present in that type in that allotment.

See list at end of table for scientific and common names of key species listed here by scientific abbreviations.

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
4010 Monitor Mesa	1,435	8,760		Hija	Kocr	Arno	Atca	1,680		Hija	Kocr	Arno	Atca
Pinyon-Juniper			32	5	3	10	1		45	10	5	10	2
Sagebrush			50	7	2	8	1		55	12	5	10	2
Broadleaf Trees			67	Spcr 33	-	-	3		70	Spcr 33	-	-	5
4011 Lower Roubideau	45	400		Spcr	Atca			65		Spcr	Atca		
Broadleaf Trees			67	33	3				67	33	10		
4012 Canal	1,000	8,875		Orhy	Kocr	Atca		1,220		Orhy	Kocr	Atca	
Pinyon-Juniper			25	2	1	2			50	10	10	10	
Saltbush			20	1	-	1			30	5	-	5	
4013 Ben Lowe	570	4,570		Orhy	Hija	Atca	Cemo	755		Orhy	Hija	Atca	Cemo
Pinyon-Juniper			53	1	4	-	1		65	10	10	-	10
Saltbush			43	3	10	3	-		50	10	15	10	-
Sagebrush			36	2	10	-	-		45	10	15	-	-
4014 Joker	115	1,050		Agro-pyron	Amal			150		Agro-pyron	Amal		
Pinyon-Juniper			35	70	3				45	70	3		
4015 White Ranch	25	265		Hija	Atca	Cemo		35		Hija	Atca	Cemo	
Pinyon-Juniper			30	20	4	3			40	25	10	5	
4016 Wells Gulch	2,680	7,160		Hija	Orhy	Atco	Atca	3,145		Hija	Orhy	Atco	Atca
Pinyon-Juniper			58	26	T	2	-		65	26	10	5	-
Desert Shrub			16	20	5	2	1		32	25	15	5	5
4017 Alkali Flats	3,560	12,220		Hija	Orhy	Atco	Atca	4,130		Hija	Orhy	Atco	Atca
Pinyon-Juniper			36	-	6	9	5		45	-	10	10	5
Saltbush			19	-	-	-	21		25	-	-	-	25
Desert Shrub			25	20	T	25	5		45	25	5	25	5
Mountain Shrub			50	-	2	-	2		60	-	5	-	5
Sagebrush			24	42	T	-	-		35	45	5	-	-
4021 Point Creek	115	390		Hija	Orhy	Atco	Atca	135		Hija	Orhy	Atco	Atca
Desert Shrub			20	5	2	1	1		35	15	10	5	5
4022 Petrie Mesa	1,430	4,415		Hija	Orhy	Arti-plex	Eula	1,430		Hija	Orhy	Atri-plex	Eula
Pinyon-Juniper			31	3	1	11	-		31	3	1	11	-
Saltbush			24	7	1	30	5		24	7	1	30	5
Desert Shrub			13	Spcr 1	-	2	-		13	Spcr 1	-	2	-
4024 Dirty George	300	2,470		Hija	Stvi	Cemo	Amal	340		Hija	Stvi	Cemo	Amal
Pinyon-Juniper			49	10	-	1	2		50	15	-	3	5
Mountain Shrub			65	-	1	8	6		65	-	10	10	10

TABLE 3-8

ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
4025 Ward Creek-Doughspoon	700	6,505		Hija	Atca	Atco		1,020		Hija	Atca	Atco	
Pinyon-Juniper			39	10	3	3			55	15	10	10	
Saltbush			36	5	10	10			50	15	15	15	
Desert Shrub			24	1	10	7			40	10	15	15	
4026 Escalante Canyon	40	1,040		Hija	Artr			40		Hija	Artr		
Pinyon-Juniper			40	15	5				40	15	5		
Saltbush			30	15	5				30	15	5		
4501 Milk Creek	15	115		Kocr	Orhy	Artr		15		Kocr	Orhy	Artr	
Mountain Shrub			75	11	9	60			75	11	9	60	
4502 Surface to Leroux	495	2,630		Popr	Agsm	Cemo		655		Popr	Agsm	Cemo	
Pinyon-Juniper			36	2	1	8			50	10	10	10	
Mountain Shrub			75	4	4	3			80	15	15	10	
4503 Stingley Gulch	125	1,070		Orhy	Pose	Pera	Cemo	150		Orhy	Pose	Pera	Cemo
Pinyon-Juniper			40	1	0	-	2		55	10	5	-	10
Mountain Shrub			55	4	8	3	7		70	10	10	5	10
4504 Leroux Creek	195	2,380		Stco	Orhy	Cemo	Artr	260		Stco	Orhy	Cemo	Artr
Pinyon-Juniper			37	-	T	5	35		50	-	10	10	35
Mountain Shrub			63	2	2	3	16		70	10	10	10	15
4505 Juniper Knob	10	75		Orhy	Atca			10		Orhy	Atca		
Pinyon-Juniper			35	3	3				35	3	3		
4506 Oak Mesa	95	1,190		Orhy	Basa	Cemo		140		Orhy	Basa	Cemo	
Pinyon-Juniper			35	3	3	3			50	10	5	5	
Mountain Shrub			72	7	7	1			80	10	10	5	
4507 Jay Creek	1,030	7,295		Orhy	Cemo			1,350		Orhy	Cemo		
Pinyon-Juniper			49	T	10				60	10	20		
Mountain Shrub			72	1	14				80	10	20		
4509 Upper Jay Creek	75	480		Agtr	Atca			95		Agtr	Atca		
Pinyon-Juniper			28	5	3				45	10	10		
Mountain Shrub			60	10	10				70	15	15		
4511 Overland	20	180		Orhy	Amal			30		Orhy	Amal		
Mountain Shrub			51	2	65				60	10	65		
4512 East Roatcap	10	40		Agtr	Amal			10		Agtr	Amal		
Mountain Shrub			51	2	65				51	2	65		
4513 Stevens Gulch	865	4,325		Orhy	Sihy	Cemo		1,070		Orhy	Sihy	Cemo	
Pinyon-Juniper			49	-	4	10			55	-	10	10	
Mountain Shrub			72	1	4	3			80	5	5	10	
Sagebrush			44	2	2	2			50	10	10	5	
4514 Upper Terror Creek	5	35		Orhy	Sihy	Amal		5		Orhy	Sihy	Amal	
Mountain Shrub			76	2	4	4			76	2	4	4	
4515 Freeman Gulch	70	615		Agsm	Cemo			70		Agsm	Cemo		
Pinyon-Juniper			52	4	6				52	4	6		
Mountain Shrub			76	4	6				76	4	6		

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
4516 North Fork	2,630	10,775		Hija	Atca	Orhy	Cemo	3,380		Hija	Atca	Orhy	Cemo
Pinyon-Juniper			56	10	6	T	3		65	15	10	10	10
					Atco						Atco		
Saltbush			15	15	24	-	-		30	25	30	-	-
Desert Shrub			14	8	22	-	-		30	20	30	-	-
				Brin	Amal					Brin	Amal		
Mountain Shrub			83	3	2	-	-		83	10	10	-	-
				Hija	Arno					Hija	Arno		
Sagebrush			38	34	13	-	-		45	35	20	-	-
					Atco						Atco		
Annuals			24	33	21	-	-		35	35	25	-	-
4517 Coal Gulch	770	6,890		Orhy	Stco	Cemo		1,000		Orhy	Stco	Cemo	
Pinyon-Juniper			45	8	2	10			55	15	15	10	
Mountain Shrub			82	8	2	5			85	15	10	10	
4518 Pilot Creek	40	60		Agsm	Amal			40		Agsm	Amal		
Mountain Shrub			90	10	T				90	10	T		
4519 Muddy Creek	25	530		Brin	Putr			25		Brin	Putr		
Mountain Shrub			85	10	2				85	10	2		
Sagebrush			55	10	2				55	10	2		
4520 Spring Creek	30	135		Brin	Putr			30		Brin	Putr		
Mountain Shrub			85	10	2				85	10	2		
4521 Stock Driveway	10	135		Brin	Amal			10		Brin	Amal		
Mountain Shrub			82	4	5				82	4	5		
4522 Downing	30	135		Brin	Amal			30		Brin	Amal		
Mountain Shrub			82	4	5				82	4	5		
4523 Williams Creek	10	120		Feid	Cemo			10		Feid	Cemo		
Mountain Shrub			75	5	5				75	5	5		
4524 Deep Creek	10	180		Feid	Artr			10		Feid	Artr		
Mountain Shrub			80	5	10				80	5	10		
Conifer			90	2	1				90	2	1		
4525 Anthracite Creek	170	1,215		Agtr	Stco	Cemo	Artr	210		Agtr	Stco	Cemo	Artr
Mountain Shrub			62	2	3	5	16		75	10	10	10	20
Conifer			76	4	-	T	5		76	10	-	5	10
Broadleaf Trees			76	4	-	T	5		76	10	-	5	10
4526 Crystal Creek	60	425		Orhy	Amal			60		Orhy	Amal		
Mountain Shrub			80	5	5				80	5	5		
Conifer			75	T	2				75	T	2		

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
4527 Jumbo Mountain	700	4,330		Stco	Orhy	Cemo	Artr	860		Stco	Orhy	Cemo	Artr
Pinyon-Juniper			46	-	T	11	7		60	-	10	15	10
						Atca						Atca	
Saltbush			33	-	T	6	-		40	-	5	10	-
						Cemo						Cemo	
Mountain Shrub			71	1	1	1	14		75	10	10	10	15
Sagebrush			44	2	2	2	57		50	10	10	5	55
						Syor						Syor	
Conifer			90	6	-	6	-		90	10	-	10	-
Broadleaf Trees			90	6	-	6	-		90	10	-	10	-
4528 Oak Ridge	335	3,095		Orhy	Agtr	Artr		400		Orhy	Agtr	Artr	
Pinyon-Juniper			47	T	1	28			55	10	10	30	
						Amal						Amal	
Mountain Shrub			70	3	3	35			80	10	10	35	
						Artr						Artr	
Sagebrush			40	0	0	85			50	5	5	70	
4529 Reynolds Creek	190	1,335		Orhy	Agtr	Artr		210		Orhy	Agtr	Artr	
Pinyon-Juniper			47	T	1	28			55	10	10	30	
						Amal						Amal	
Mountain Shrub			82	1	T	18			82	10	10	15	
						Artr						Artr	
Sagebrush			36	0	0	100			50	5	5	80	
4530 McDonald Mesa	205	2,105		Agsm	Atca	Atco		310		Agsm	Atca	Atco	
Pinyon-Juniper			45	3	5	-			55	10	10	-	
Saltbush			20	5	10	10			30	10	15	10	
Sagebrush			25	5	5	15			40	10	10	15	
4531 Popp Ranch	15	260		Orhy	Artr			15		Orhy	Artr		
Pinyon-Juniper			47	T	28				47	T	28		
Sagebrush			36	-	100				36	-	100		
4532 McDonald Ranch	725	3,060		Agsm	Hija	Atco	Atca	815		Agsm	Hija	Atco	Atca
Pinyon-Juniper			20	T	5	5	5		40	10	10	10	10
Saltbush			17	5	5	15	5		30	10	10	15	10
Sagebrush			28	5	5	5	10		35	10	10	10	15
4535 Home Place	15	100		Sihy	Atco			15		Sihy	Atco		
Saltbush			28	5	64				28	5	64		
4536 West Young's Peak	10	100		Agsm	Atco	Cemo		15		Agsm	Atco	Cemo	
Pinyon-Juniper			73	1	-	4			73	5	-	10	
Saltbush			28	-	64	-			35	-	64	-	

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)		Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)	
4537 Young's Peak	240	1,500		Agsm	Cemo	280		Agsm	Cemo
Pinyon-Juniper			73	1	4		75	10	10
4538 Missouri Flats	5	135		Popr	Amal	5		Popr	Amal
Mountain Shrub			82	1	18		82	1	18
4539 Cottonwood Creek	10	135		Popr	Amal	10		Popr	Amal
Mountain Shrub			82	1	18		82	1	18
4540 North Saddle Peak	40	265		Popr	Amal	45		Popr	Amal
Mountain Shrub			82	1	18		85	10	20
4541 Sunshine Mesa	5	25		Sihy	Amal	5		Sihy	Amal
Pinyon-Juniper			24	20	41		30	15	40
4543 South Saddle Peak	20	255		Orhy	Cemo	20		Orhy	Cemo
Pinyon-Juniper			46	T	15		46	T	15
4548 Creek Bottom	10	175		Agtr	Artr	10		Agtr	Artr
Conifer			76	4	5		76	4	5
Broadleaf Trees			76	4	5		76	4	5
4549 Dry Creek	265	3,380		Orhy	Cemo	410		Orhy	Cemo
Pinyon-Juniper			42	2	2		55	10	5
Mountain Shrub			55	1	4		70	10	10
5002 Dedication Site	100	1,575		Hija	Atca	100		Hija	Atca
Pinyon-Juniper			31	10	19		31	10	19
5003 Selig Canal	725	2,565		Stco	Atri-plex	815		Stco	Atri-plex
Pinyon-Juniper			30	27	3		50	30	10
Saltbush			12	Orhy T	30		20	Orhy 10	35
Mountain Shrub			56	Feid 18	Artr 23		65	Feid 25	Artr 25
5008 Brush Point	1,755	4,625		Hija	Atco	2,315		Hija	Atco
Pinyon-Juniper			30	10	15		45	20	30
Saltbush			20	15	25		30	20	30
Barren			0	-	-		-	-	-
5010 Dead Horse	200	850		Brin	Cemo	250		Brin	Cemo
Mountain Shrub			83	3	T		90	10	5
Sagebrush			75	T	T		80	5	5
5011 Gould Reservoir	390	2,510		Orhy	Amal	470		Orhy	Amal
Mountain Shrub			68	T	14		80	10	15
Sagebrush			41	T	7		50	10	10
5012 Cedar Point	80	405		Orhy	Amal	80		Orhy	Amal
Pinyon-Juniper			55	1	15		55	1	15
Mountain Shrub			70	T	10		65	T	10
Sagebrush			80	1	10		70	1	10

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
5013 Iron Canyon	135	1,115		Orhy	Arno			175		Orhy	Arno		
Pinyon-Juniper			48	T	23				55	5	30		
					Amal						Amal		
Mountain Shrub			68	T	14				75	5	15		
Sagebrush			41	T	7				45	5	10		
5014 Poison Spring	145	1,155		Orhy	Arno			210		Orhy	Arno		
Pinyon-Juniper			48	T	6				55	10	10		
Mountain Shrub			65	T	14				70	10	20		
Sagebrush			63	T	14				70	10	20		
5015 Grizzly Gulch	260	1,715		Orhy	Amal			300		Orhy	Amal		
Mountain Shrub			65	T	20				70	10	20		
Sagebrush			41	T	5				50	10	10		
5016 Black Canyon	45	390		Kocr	Amal			50		Kocr	Amal		
Mountain Shrub			80	10	19				80	15	25		
Sagebrush			40	5	10				55	10	15		
5017 Green Mountain	2,825	10,560		Kocr	Orhy	Amal	Atca	3,725		Kocr	Orhy	Amal	Atca
Pinyon-Juniper			40	-	T	-	1		60	-	10	-	10
Mountain Shrub			55	24	-	20	-		65	25	-	25	-
Sagebrush			42	20	5	5	-		55	25	10	10	-
5020 Black Ridge	605	4,155		Orhy	Artr	Atca		765		Orhy	Artr	Atca	
Pinyon-Juniper			44	2	-	T			60	10	-	10	
Sagebrush			28	T	40	-			40	10	40	-	
5022 Rabbit Gulch	70	300		Orhy	Arno	Atca		70		Orhy	Arno	Atca	
Pinyon-Juniper			45	4	-	T			45	4	-	T	
Sagebrush			38	T	13	-			38	T	13	-	
5025 Fruitland Mesa	5	50		Hija	Artr			5		Hija	Artr		
Pinyon-Juniper			50	5	20				50	5	20		
5026 Star Nelson Airport	5	15		Sihy	Atco			5		Sihy	Atco		
Saltbush			15	2	5				15	2	5		
5027 Adobe	30	335		Orhy	Pera			35		Orhy	Pera		
Pinyon-Juniper			63	5	38				70	5	38		
Sagebrush			55	5	10				60	5	10		
5028 Doug Creek	70	445		Orhy	Pera			80		Orhy	Pera		
Pinyon-Juniper			63	5	38				70	10	40		
5029 Spring Gulch	150	480		Brin	Cemo			180		Brin	Cemo		
Mountain Shrub			83	5	T				90	10	10		
Sagebrush			75	T	T				80	5	10		
Conifer			85	-	-				85	-	-		
Broadleaf Trees			76	-	-				76	-	-		

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)			Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)		
5030 Bostwick Park	380	750		Orhy	Atco	Artr	450		Orhy	Atco	Artr
Pinyon-Juniper			40	3	-	3		45	10	-	10
Saltbush			30	-	20	-		40	-	25	-
Mountain Shrub			60	5	-	5		65	10	-	10
5033 Pinyon Springs	160	860		Agsm	Amal		160		Agsm	Amal	
Pinyon-Juniper			45	4	4			45	4	4	
Mountain Shrub			63	T	29			63	T	29	
5036 Big Gulch	5	25		Spcr	Atco		5		Spcr	Atco	
Desert Shrub			11	2	18			11	2	18	
5037 Black Mesa	0**	0					0				
Mountain Shrub			-	-	-			-	-	-	
Conifer			-	-	-			-	-	-	
5038 Red Canyon	5	55		Hija	Artr		5		Hija	Artr	
Pinyon-Juniper			50	5	20			50	5	20	
5039 Onion Valley	20	35		Stvi	Amal		20		Stvi	Amal	
Mountain Shrub			55	20	25			55	20	25	
5040 Pine Ridge	15	70		Stvi	Amal		15		Stvi	Amal	
Mountain Shrub			50	15	25			50	15	25	
Broadleaf Trees			80	15	-			80	15	-	
5041 East Gould Reservoir	40	530		Agsm	Artr		60		Agsm	Artr	
Sagebrush			39	3	74			50	10	75	
5043 Collins	15	305		Orhy	Cemo		15		Orhy	Cemo	
Pinyon-Juniper			55	T	15			55	T	15	
5044 Big Pasture	20	220		Orhy	Cemo		20		Orhy	Cemo	
Pinyon-Juniper			55	T	15			55	T	15	
					Artr					Artr	
Sagebrush			45	T	40			45	T	40	
5045 Black Bullet	5	55		Hija	Artr		5		Hija	Artr	
Pinyon-Juniper			55	5	20			55	5	20	
5046 Big Gulch	35	190		Agsm	Atca		40		Agsm	Atca	
Pinyon-Juniper			45	5	10			50	10	10	
Desert Shrub			11	5	10			20	5	15	

** This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)		Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)	
5047 Mesa Creek	75	115		Stvi	Amal	75		Stvi	Amal
Mountain Shrub			75	10	15		75	10	15
Conifer			80	10	10		80	10	10
5048 Morrow Point	40	60		Stvi	Amal	40		Stvi	Amal
Mountain Shrub			75	10	15		75	10	15
Conifer			80	10	10		80	10	10
5049 Smith Fork	30	255		Orhy	Artr	45		Orhy	Artr
Pinyon-Juniper			45	4	13		60	10	20
5050 Allen Reservoir	30	220		Orhy	Pera	40		Orhy	Pera
Pinyon-Juniper			63	5	38		70	10	40
Sagebrush			55	T	10		60	5	15
5502 Sandy Wash	940	6,275		Hija	Atca	1,140		Hija	Atca
Pinyon-Juniper			51	12	5		60	15	10
Waste			43	31	2		55	35	5
5503 Green	50	375		Orhy	Atca	65		Orhy	Atca
Pinyon-Juniper			25	4	1		40	10	5
5504 Roatcap	350	2,560		Hija	Atca	445		Hija	Atca
Pinyon-Juniper			25	20	1		50	25	5
Sagebrush			30	10	1		45	15	5
				Orhy				Orhy	
Grass			60	15	5		65	20	10
5505 Transfer	300	2,475		Orhy	Cemo	355		Orhy	Cemo
Pinyon-Juniper			51	10	1		60	20	10
					Arno				Arno
Waste			43	T	9		50	5	15
5507 Pipeline	2,270	15,990		Orhy	Cemo	2,890		Orhy	Cemo
Pinyon-Juniper			44	5	2		60	10	10
				Hija	Artr			Hija	Artr
Halfshrub			59	37	2		65	40	10
5508 Government Springs	180	1,885		Orhy	Cemo	225		Orhy	Cemo
Pinyon-Juniper			40	15	1		55	20	5
5509 Coal Creek	50	265		Hija	Bogr	50		Hija	Bogr
Halfshrub			59	37	31		59	37	31
5510 Bald Hills	25	170		Kocr	Amal	25		Kocr	Amal
Mountain Shrub			80	5	15		80	5	5
Sagebrush			65	5	5		65	5	5
5511 Shavano Mesa	200	1,630		Hija	Atca	260		Hija	Atca
Pinyon-Juniper			35	15	T		50	20	5
Sagebrush			45	15	T		55	20	5
Halfshrub			65	10	T		70	20	5

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)			Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)		
5512 Franklin Mesa	355	3,000		Hija	Artr		440		Hija	Artr	
Pinyon-Juniper			35	15	10			50	20	15	
Sagebrush			40	10	25			50	15	30	
Grass			40	10	25			50	15	30	
5513 Dry Creek Basin	410	4,520		Orhy	Artr		535		Orhy	Artr	
Pinyon-Juniper			57	9	28			65	15	30	
Sagebrush			45	T	30			60	5	30	
5514 East Fork Dry Creek	15	115		Orhy	Amal		15		Orhy	Amal	
Pinyon-Juniper			60	10	5			60	10	5	
Mountain Shrub			90	15	20			90	15	20	
					Artr					Artr	
Sagebrush			60	15	20			60	15	20	
Broadleaf Trees			75	-	-			75	-	-	
5515 Olathe Reservoir	15	155		Orhy	Cemo		15		Orhy	Cemo	
Pinyon-Juniper			57	7	9			57	7	9	
Mountain Shrub			90	15	15			90	15	15	
5516 Piney	800	6,945		Orhy	Amal		1,110		Orhy	Amal	
Mountain Shrub			40	10	20			55	10	20	
					Artr					Artr	
Sagebrush			35	5	35			45	10	40	
5517 Spring Creek Canyon	35	370		Orhy	Artr		35		Orhy	Artr	
Pinyon-Juniper			35	T	3			35	T	3	
5518 Dave Wood	215	2,140		Orhy	Cemo		340		Orhy	Cemo	
Pinyon-Juniper			55	T	10			65	5	15	
					Artr					Artr	
Sagebrush			50	T	35			55	5	40	
5520 Lower Horsefly	965	5,710		Orhy	Atco	Cemo	1,105		Orhy	Atco	Cemo
Pinyon-Juniper			63	6	-	13		70	10	-	15
Saltbush			42	2	43	-		50	10	45	-
Sagebrush			53	4	28	-		60	10	35	-
5521 Highway 90	445	5,185		Orhy	Atca		685		Orhy	Atca	
Pinyon-Juniper			50	2	2			65	10	10	
5522 Beaver Hill	1,570	16,485		Orhy	Atca		1,875		Orhy	Atca	
Pinyon-Juniper			50	5	5			60	10	10	
5523 Horsefly	55	470		Kocr	Cemo		130		Kocr	Cemo	
Pinyon-Juniper			36	7	3			52	15	10	

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
5524 Duckett Draw	15	230		Hija	Sihy	Atca	Artr	20		Hija	Sihy	Atca	Artr
Pinyon-Juniper			45	-	16	-	27		50	-	20	-	30
Sagebrush			24	29	-	T	-		40	30	-	T	-
5525 Dry Creek	15	85		Spcr	Artr			15		Spcr	Artr		
Pinyon-Juniper			35	10	10				35	10	10		
Grass			20	20	-				20	20	-		
5529 Log Hill	310	3,395		Orhy	Amal			420		Orhy	Amal		
Pinyon-Juniper			75	5	5				80	10	10		
Mountain Shrub			70	10	15				80	15	20		
5530 Billy Creek	265	1,480		Hija	Orhy	Cemo	Atco	550		Hija	Orhy	Cemo	Atco
Pinyon-Juniper			46	5	T	T	-		60	10	5	5	T
Saltbush			42	-	5	-	33		50	-	10	-	35
Mountain Shrub			63	-	T	2	-		70	-	5	5	-
Sagebrush			45	5	5	-	10		50	10	10	-	15
Grass			60	5	10	2	2		70	10	15	5	5
5532 Burro Ridge	20	165		Orhy	Artr			25		Orhy	Artr		
Pinyon-Juniper			45	T	10				55	5	15		
Mountain Shrub			63	T	10				70	10	15		
Sagebrush			45	5	30				50	15	35		
5533 Onion Lakes	35	410		Brin	Cemo			35		Brin	Cemo		
Mountain Shrub			63	3	2				63	3	2		
Conifer			61	3	-				61	3	-		
5534 Shin Park	300	510		Orhy	Atco			300		Orhy	Atco		
Pinyon-Juniper			52	10	5				52	10	5		
Saltbush			30	3	13				30	5	15		
5535 Cedar Creek	10	30		Orhy	Amal			10		Orhy	Amal		
Pinyon-Juniper			45	10	5				45	10	5		
					Atco						Atco		
Saltbush			30	3	15				30	3	15		
5536 South Canal	120	275		Orhy	Atco			120		Orhy	Atco		
Saltbush			30	3	13				30	3	13		
5538 Rock Ditch	5	5		Orhy	Atco			5		Orhy	Atco		
Saltbush			30	3	13				30	3	13		
5540 Dry Gulch	930	4,050		Agsm	Atca			1,035		Agsm	Atca		
Pinyon-Juniper			26	13	T				40	20	10		
Mountain Shrub			60	15	T				65	20	5		
Sagebrush			25	26	1				40	30	5		
Broadleaf Trees			65	20	1				70	20	10		

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)
5542 Bosgal	5	5		Orhy Atco	10		Orhy Atco
Saltbush			20	10 30		30	10 30
5543 Waugh	10	25		Agsm Atco	10		Agsm Atco
Pinyon-Juniper			35	10 5		35	10 5
Saltbush			20	5 70		20	5 70
5544 Kelly	5	10		Agsm Atco	5		Agsm Atco
Saltbush			45	8 50		45	8 50
5545 Henshaw	15	20		Sihy Artr	20		Sihy Artr
Pinyon-Juniper			50	10 10		60	15 10
Sagebrush			48	10 30		55	10 35
5546 Waterdog Basin	45	290		Orhy Amal	45		Orhy Amal
Pinyon-Juniper			63	5 2		63	5 2
				Artr			Artr
Sagebrush			45	10 25		45	10 25
5547 Slagle Pass	40	260		Brin Viam	40		Brin Viam
Conifer			61	5 11		61	5 11
5548 Washboard Rock	55	260		Orhy Amal	55		Orhy Amal
Mountain Shrub			55	10 15		55	10 15
				Brin Viam			Brin Viam
Conifer			61	5 11		61	5 11
				Feth			Feth
Grass			85	45 -		85	45 -
				Brin Agro-pyron			Brin Agro-pyron
Broadleaf Trees			99	10 5		99	10 5
5549 High Park	110	650		Stco Artr	110		Stco Artr
Sagebrush			65	5 14		65	5 14
Barren			0	- -		0	- -
				Brin Viam			Brin Viam
Conifer			61	5 11		61	5 11
				Feth			Feth
Grass			87	24 -		87	24 -
5551 Dexter Creek	5	55		Orhy Amal	5		Orhy Amal
Mountain Shrub			50	5 10		50	5 10
5552 Dallas	15	200		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			45	2 24		45	2 24
				Artr			Artr
Sagebrush			40	1 22		40	1 22
5553 Fisher Creek	40	400		Agsm Cemo	40		Agsm Cemo
Pinyon-Juniper			45	T 20		45	T 20
				Arno			Arno
Mountain Shrub			59	5 20		59	5 20

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION
COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)		Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)	
5555 Taylor Draw	25	270		Sihy	Amal	25		Sihy	Amal
Pinyon-Juniper			64	3	3		64	3	3
5556 Burro Creek	10	100		Orhy	Amal	10		Orhy	Amal
Pinyon-Juniper			60	5	3		60	5	3
5557 Alkali	40	405		Orhy	Cemo	40		Orhy	Cemo
Pinyon-Juniper			55	5	10		55	5	10
Sagebrush			50	5	T		50	5	T
5559 South Fork	15	100		Orhy	Cemo	15		Orhy	Cemo
Pinyon-Juniper			45	2	24		45	2	24
Sagebrush			45	5	10		45	5	10
5560 Cookie Tree	50	535		Orhy	Cemo	50		Orhy	Cemo
Pinyon-Juniper			45	2	20		45	2	20
Sagebrush			45	2	5		45	2	5
5561 East Fork	5	65		Orhy	Cemo	5		Orhy	Cemo
Pinyon-Juniper			38	13	3		38	13	3
Mountain Shrub			45	5	3		45	5	3
5562 Hillside	10	135		Stco	Amal	15		Stco	Amal
Pinyon-Juniper			52	T	5		55	5	10
Mountain Shrub			60	1	10		65	5	10
Sagebrush			45	2	2		55	10	5
5563 Moonshine Park	10	175		Brin	Amal	10		Brin	Amal
Mountain Shrub			53	10	20		53	10	20
Conifer			65	5	5		65	5	5
Grass			73	35	-		73	35	-
Broadleaf Trees			97	18	5		97	18	5
5564 Gravel Pit	5	35		Orhy	Cemo	5		Orhy	Cemo
Pinyon-Juniper			43	T	5		45	T	5
5565 Tommy Creek	20	100		Sihy	Amal	20		Sihy	Amal
Pinyon-Juniper			64	3	3		64	3	3
					Atco				Atco
Desert Shrub			45	10	20		45	10	20
					Amal				Amal
Mountain Shrub			71	8	10		71	8	10
5566 Cow Creek	105	435		Orhy	Amal	120		Orhy	Amal
Mountain Shrub			73	1	11		80	5	15
Conifer			70	1	3		75	5	5
Broadleaf Trees			80	T	2		80	T	2
5567 Busted Boiler	5	35		Orhy	Cemo	5		Orhy	Cemo
Pinyon-Juniper			75	10	5		75	10	5

TABLE 3-8
ESTIMATED FUTURE VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION UNDER THE PROPOSED ACTION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY AND PRESENT COMPOSITION (cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)				Future Prod. a/ (AUMs)	Future Veg. Dens. b/ (%)	Future Key Species Composition c/ (%)			
5568 Baldy	135	565		Stco	Amal			165		Stco	Amal		
Mountain Shrub			52	T	5				60	10	10		
				Brin						Brin			
Conifer			60	5	2				60	10	5		
Grass			55	20	-				65	25	-		
5569 Hairpin	30	65		Orhy	Cemo			40		Orhy	Cemo		
Sagebrush			54	4	4				65	10	10		
5570 Cedar	375	1,770		Sihy	Stco	Agsm	Amal	470		Sihy	Stco	Agsm	Amal
Pinyon-Juniper			24	13	-	T	4		40	15	-	5	10
Mountain Shrub			33	2	T	2	2		42	10	5	5	5
Sagebrush			44	-	7	2	4		55	-	10	5	10
5572 McKenzie Creek	10	20		Orhy	Cemo			10		Orhy	Cemo		
Pinyon-Juniper			61	8	3				61	8	3		
5574 Tappan Creek	20	200		Sihy	Artr			20		Sihy	Artr		
Pinyon-Juniper			31	3	68				31	3	68		
TOTAL	51,315	323,880						63,960					

LIST OF KEY VEGETATIVE SPECIES
AND SCIENTIFIC ABBREVIATIONS

Species Abbreviation	Species Name	Common Name
GRASSES		
Agin	*Agropyron intermedium*	Intermediate wheatgrass
Agcr	*Agropyron cristatum*	Crested wheatgrass
Agsm	*Agropyron smithii*	Western wheatgrass
Agtr	*Agropyron trachycaulum*	Slender wheatgrass
Bogr	*Bouteloua gracilis*	Blue grama
Brin	*Bromus inermis*	Smooth brome
Feid	*Festuca idahoensis*	Idaho fescue
Feth	*Festuca thurberi*	Thurber fescue
Hija	*Hilaria jamesii*	Galleta grass
Kocr	*Koeleria cristata*	Junegrass
Orhy	*Oryzopsis hymenoides*	Indian ricegrass
Popr	*Poa pratensis*	Kentucky bluegrass
Pose	*Poa secunda*	Sandberg bluegrass
Sihy	*Sitanion hystrix*	Bottlebrush squirreltail
Spcr	*Sporobolus cryptandrus*	Sand dropseed
Stco	*Stipa comata*	Needle-and-thread
Stvi	*Stipa viridula*	Green needlegrass
FORBS		
Basa	*Balsamorhiza sagittata*	Arrowleaf balsamroot
Viam	*Vicia americana*	American vetch
SHRUBS		
Amal	*Amelanchier alnifolia*	Common serviceberry
Arno	*Artemisia nova*	Black sagebrush
Artr	*Artemisia tridentata*	Big sagebrush
Atca	*Atriplex canescens*	Fourwing saltbush
Atco	*Atriplex confertifolia*	Shadscale
Atcr	*Atriplex corrugata*	Mat saltbush
Atnu	*Atriplex nuttalli*	Nuttall saltbush
Cemo	*Cercocarpus montanus*	Mountain mahogany
Epvi	*Ephedra viridis*	Mormon tea
Pera	*Peraphyllum ramosissimum*	Squaw apple
Putr	*Purshia tridentata*	Bitterbrush
Syor	*Symphoricarpos oreophilus*	Mountain snowberry

TABLE 3-9

PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
4001 Dominguez							58,335
Pinyon-Juniper	-	31,075	14,780	22,980	22,875	-	
Saltbush	-	2,240	-	2,240	-	-	
Desert Shrub	-	220	7,940	220	7,940	-	
Sagebrush	2,080	-	-	2,080	-	-	
4002 Lower Escalante							2,240
Pinyon-Juniper	-	1,145	-	570	575	-	
Saltbush	-	80	-	80	-	-	
Desert Shrub	-	-	470	-	470	-	
Sagebrush	-	-	545	-	545	-	
4005 Fall Cabin							360
Pinyon-Juniper	-	360	-	-	360	-	
4006 Dry Mesa:							
A Escalante Subunit							2,280
Saltbush	-	1,480	-	1,480	-	-	
Sagebrush	-	120	680	120	680	-	
B Dry Mesa Subunit							16,165
Pinyon-Juniper	1,235	6,725	-	4,595	3,365	-	
Saltbush	-	1,680	-	1,680	-	-	
Sagebrush	4,205	2,320	-	6,525	-	-	
C Smith Ranch Subunit							150
Pinyon-Juniper	-	150	-	-	150	-	
D Escalante Subunit							300
Pinyon-Juniper	-	300	-	-	300	-	
4007 Sawmill Mesa							12,095
Pinyon-Juniper	1,080	3,040	6,935	2,600	8,455	-	
Saltbush	-	800	-	800	-	-	
Sagebrush	-	-	240	-	240	-	
4008 25 Mesa							10,405
Pinyon-Juniper	-	-	7,565	-	7,565	-	
Saltbush	-	2,320	-	2,320	-	-	
Broadleaf Trees	360	160	-	520	-	-	
4010 Monitor Mesa							15,735
Pinyon-Juniper	-	2,200	11,335	3,145	10,390	-	
Sagebrush	-	1,760	-	1,760	-	-	
Broadleaf Trees	-	-	440	-	440	-	
4011 Lower Roubideau Canyon							480
Broadleaf Trees	-	-	480	-	480	-	
4012 Canal							10,650
Pinyon-Juniper	-	1,600	2,690	800	3,490	-	
Saltbush	-	-	6,360	-	6,360	-	
4013 Ben Lowe							5,490
Pinyon-Juniper	-	1,515	240	755	1,000	-	
Saltbush	-	-	2,855	-	2,855	-	
Sagebrush	-	880	-	880	-	-	
4014 Joker							1,835
Pinyon-Juniper	-	490	1,345	245	1,590	-	
4015 White Ranch							415
Pinyon-Juniper	-	-	415	-	415	-	
4016 Wells Gulch							16,955
Pinyon-Juniper	1,060	-	-	1,060	-	-	
Desert Shrub	-	5,030	10,865	5,030	10,865	-	
4017 Alkali Flats							27,830
Pinyon-Juniper	-	5,300	1,040	2,650	3,690	-	
Saltbush	-	1,695	2,830	1,695	2,830	-	
Desert Shrub	-	620	12,785	620	12,785	-	
Mountain Shrub	-	840	-	840	-	-	
Sagebrush	-	-	2,720	-	2,720	-	
4021 Point Creek							1,000
Desert Shrub	-	520	480	520	480	-	
4022 Petrie Mesa:							
E Peach Valley Subunit							11,035
Pinyon-Juniper	6,805	-	-	6,805	-	-	
Saltbush	-	-	1,130	-	1,130	-	
Desert Shrub	-	-	3,100	-	3,100	-	
F Petrie Mesa Subunit							2,825
Saltbush	-	-	1,745	-	1,745	-	
Desert Shrub	-	-	1,080	-	1,080	-	
4024 Dirty George							2,385
Pinyon-Juniper	-	2,030	-	1,015	1,015	-	
Mountain Shrub	-	355	-	355	-	-	
4025 Ward Creek-Doughspoon							17,910
Pinyon-Juniper	-	3,180	1,050	2,490	1,740	-	
Saltbush	-	2,600	9,720	2,600	9,720	-	
Desert Shrub	-	615	745	615	745	-	
4026 Escalante Canyon							1,270
Pinyon-Juniper	-	900	160	-	900	160	
Saltbush	-	210	-	-	210	-	
4501 Milk Creek							105
Mountain Shrub	105	-	-	105	-	-	

TABLE 3-9

PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
4502 Surface to Leroux							3,230
Pinyon-Juniper	60	1,590	-	855	795	-	
Mountain Shrub	1,580	-	-	1,580	-	-	
4503 Stingley Gulch							1,080
Pinyon-Juniper	-	930	-	465	465	-	
Mountain Shrub	-	150	-	150	-	-	
4504 Leroux Creek							2,555
Pinyon-Juniper	-	1,510	-	910	600	-	
Mountain Shrub	-	1,045	-	1,045	-	-	
4505 Juniper Knob							120
Pinyon-Juniper	-	-	120	-	-	120	
4506 Oak Mesa:							
G Subunit 1							600
Pinyon-Juniper	-	600	-	450	150	-	
H Subunit 2							750
Pinyon-Juniper	-	200	-	200	-	-	
Mountain Shrub	-	550	-	550	-	-	
4507 Jay Creek							9,205
Pinyon-Juniper	-	7,070	-	4,860	2,210	-	
Mountain Shrub	-	2,135	-	2,135	-	-	
4509 Upper Jay Creek							430
Pinyon-Juniper	-	100	-	-	100	-	
Mountain Shrub	-	330	-	330	-	-	
4511 Overland							160
Mountain Shrub	-	160	-	160	-	-	
4512 East Roatcap							30
Mountain Shrub	-	30	-	-	30	-	
4513 Stevens Gulch:							
I Roatcap Creek Subunit							2,120
Pinyon-Juniper	-	750	-	375	375	-	
Mountain Shrub	-	1,190	-	1,190	-	-	
Sagebrush	-	180	-	180	-	-	
J Terror Creek Subunit							4,435
Pinyon-Juniper	200	1,625	-	1,440	385	-	
Mountain Shrub	1,395	1,135	-	2,530	-	-	
Sagebrush	-	80	-	80	-	-	
4514 Upper Terror Creek							30
Mountain Shrub	30	-	-	30	-	-	
4515 Freeman Gulch							620
Pinyon-Juniper	-	120	-	-	120	-	
Mountain Shrub	495	5	-	495	5	-	
4516 North Fork:							
K South-of-Hotchkiss							
Subunit							1,395
Saltbush	-	-	645	-	645	-	
Sagebrush	-	715	35	715	35	-	
L Hubbard Subunit							1,705
Pinyon-Juniper	25	885	-	465	445	-	
Mountain Shrub	395	400	-	795	-	-	
M Deer Basin Subunit							20,320
Pinyon-Juniper	960	4,075	-	2,995	2,040	-	
Saltbush	-	600	1,390	600	1,390	-	
Desert Shrub	-	2,890	10,125	2,890	10,125	-	
Annuals	280	-	-	280	-	-	
4517 Coal Gulch							7,720
Pinyon-Juniper	-	200	-	100	100	-	
Mountain Shrub	5,980	640	-	6,620	-	-	
Conifer	900	-	-	900	-	-	
4518 Pilot Creek							45
Mountain Shrub	45	-	-	45	-	-	
4519 Muddy Creek							500
Mountain Shrub	390	-	-	390	-	-	
Sagebrush	110	-	-	110	-	-	
4520 Spring Creek							120
Mountain Shrub	120	-	-	120	-	-	
4521 Stock Driveway							120
Mountain Shrub	120	-	-	120	-	-	
4522 Downing							120
Mountain Shrub	120	-	-	120	-	-	
4523 Williams Creek							110
Mountain Shrub	80	30	-	80	30	-	
4524 Deep Creek							160
Mountain Shrub	15	-	-	15	-	-	
Conifer	145	-	-	145	-	-	
4525 Anthracite Creek							1,115
Mountain Shrub	-	1,040	-	1,040	-	-	
Conifer	-	25	-	25	-	-	
Broadleaf Trees	-	50	-	50	-	-	
4526 Crystal Creek							480
Mountain Shrub	445	-	-	445	-	-	
Conifer	35	-	-	35	-	-	

TABLE 3-9
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
4527 Jumbo Mountain							4,970
Pinyon-Juniper	-	1,535	330	1,260	605	-	
Saltbush	-	-	690	100	590	-	
Mountain Shrub	-	1,825	-	1,825	-	-	
Sagebrush	-	-	300	300	-	-	
Conifer	-	30	-	30	-	-	
Broadleaf Trees	-	260	-	260	-	-	
4528 Oak Ridge							3,600
Pinyon-Juniper	-	230	-	115	115	-	
Mountain Shrub	390	2,905	-	3,295	-	-	
Sagebrush	-	75	-	75	-	-	
4529 Reynolds Creek							1,200
Pinyon-Juniper	45	175	-	130	90	-	
Mountain Shrub	620	-	-	620	-	-	
Sagebrush	-	360	-	360	-	-	
4530 McDonald Mesa							3,185
Pinyon-Juniper	-	1,945	-	970	975	-	
Saltbush	-	-	880	-	880	-	
Sagebrush	-	360	-	360	-	-	
4531 Popp Ranch							265
Pinyon-Juniper	-	100	-	-	100	-	
Sagebrush	-	165	-	-	165	-	
4532 McDonald Ranch:							
N Lambing Shed Subunit							4,640
Pinyon-Juniper	-	200	-	100	100	-	
Saltbush	-	-	2,880	-	2,880	-	
Sagebrush	-	1,560	-	1,560	-	-	
O South-of-Town Subunit							2,155
Saltbush	-	-	2,155	-	2,155	-	
P Harrington Subunit							535
Saltbush	-	20	515	20	515	-	
4535 Home Place							160
Saltbush	-	-	160	-	160	-	
4536 West Young's Peak							160
Pinyon-Juniper	-	110	-	-	110	-	
Saltbush	-	50	-	-	50	-	
4537 Young's Peak:							
Q Young's Peak Subunit							2,260
Pinyon-Juniper	-	2,260	-	1,130	1,130	-	
R Crawford Subunit							260
Pinyon-Juniper	-	260	-	-	260	-	

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
4538 Missouri Flats							120
Mountain Shrub	-	120	-	-	120	-	
4539 Cottonwood Creek							120
Mountain Shrub	-	120	-	-	120	-	
4540 North Saddle Peak							240
Mountain Shrub	240	-	-	240	-	-	
4541 Sunshine Mesa							40
Pinyon-Juniper	-	40	-	-	40	-	
4543 South Saddle Peak							220
Pinyon-Juniper	-	220	-	-	220	-	
4548 Creek Bottom							185
Conifer	175	-	-	175	-	-	
Broadleaf Trees	10	-	-	10	-	-	
4549 Dry Creek							3,110
Pinyon-Juniper	-	1,540	-	770	770	-	
Mountain Shrub	360	1,210	-	1,570	-	-	
5002 Dedication Site							1,915
Pinyon-Juniper	-	1,915	-	-	1,915	-	
5003 Selig Canal:							
S Selig Canal Subunit							5,660
Pinyon-Juniper	1,260	-	-	1,260	-	-	
Saltbush	-	-	4,400	-	4,400	-	
T Rawhide-Coffeepot Subunit							2,005
Pinyon-Juniper	1,405	-	-	1,405	-	-	
Mountain Shrub	-	-	600	-	-	600	
5008 Brush Point							18,205
Pinyon-Juniper	1,120	4,650	-	3,445	2,325	-	
Saltbush	-	-	8,260	-	8,260	-	
Barren	-	-	4,175	-	4,175	-	
5010 Dead Horse							955
Mountain Shrub	-	860	-	860	-	-	
Sagebrush	-	95	-	95	-	-	
5011 Gould Reservoir							2,825
Mountain Shrub	-	2,595	-	2,595	-	-	
Sagebrush	-	230	-	230	-	-	
5012 Cedar Point							620
Pinyon-Juniper	-	-	480	-	-	480	
Mountain Shrub	-	110	-	-	110	-	
Sagebrush	-	30	-	-	30	-	

TABLE 3-9
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5013 Iron Canyon							1,335
Pinyon-Juniper	-	15	-	5	10	-	
Mountain Shrub	-	970	-	970	-	-	
Sagebrush	-	190	160	190	160	-	
5014 Poison Spring							1,570
Pinyon-Juniper	-	-	295	-	295	-	
Mountain Shrub	-	-	1,090	-	1,090	-	
Sagebrush	-	-	185	-	185	-	
5015 Grizzly Gulch							1,930
Mountain Shrub	880	-	-	880	-	-	
Sagebrush	730	-	320	730	320	-	
5016 Black Canyon							440
Mountain Shrub	-	-	375	-	375	-	
Sagebrush	-	-	65	-	65	-	
5017 Green Mountain							20,825
Pinyon-Juniper	1,530	4,195	4,610	4,130	6,205	-	
Mountain Shrub	4,830	-	-	4,830	-	-	
Sagebrush	630	4,440	590	5,070	590	-	
5020 Black Ridge							6,875
Pinyon-Juniper	-	845	4,790	1,220	4,415	-	
Sagebrush	-	1,240	-	1,240	-	-	
5022 Rabbit Gulch							1,250
Pinyon-Juniper	-	690	-	345	345	-	
Sagebrush	535	25	-	560	-	-	
5025 Fruitland Mesa							80
Pinyon-Juniper	-	80	-	-	80	-	
5026 Star Nelson Airport							80
Saltbush	-	-	80	-	-	80	
5027 Adobe							300
Pinyon-Juniper	-	-	205	-	-	205	
Sagebrush	-	-	95	-	-	95	
5028 Doug Creek							400
Pinyon-Juniper	-	-	400	-	400	-	
5029 Spring Gulch							1,430
Mountain Shrub	-	50	665	50	665	-	
Sagebrush	-	-	605	-	605	-	
Conifer	-	-	75	-	75	-	
Broadleaf Trees	-	-	35	-	35	-	
5030 Bostwick Park:							
U Black Canyon-Jones Draw Subunit							1,655
Pinyon-Juniper	-	1,425	-	710	715	-	
Mountain Shrub	-	190	40	190	40	-	
V Adobe South Subunit							3,480
Pinyon-Juniper	-	-	50	-	50	-	
Saltbush	-	-	3,430	-	3,430	-	
W Bostwick Park Subunit							360
Pinyon-Juniper	-	360	-	-	360	-	
5033 Pinyon Springs							1,030
Pinyon-Juniper	-	670	-	-	670	-	
Mountain Shrub	-	-	360	-	-	360	
5036 Big Gulch							40
Desert Shrub	-	-	40	-	40	-	
5037 Black Mesa							500
Mountain Shrub	360	-	-	360	-	-	
Conifer	140	-	-	140	-	-	
5038 Red Canyon							80
Pinyon-Juniper	-	-	80	-	-	80	
5039 Onion Valley							40
Mountain Shrub	-	40	-	-	40	-	
5040 Pine Ridge							80
Mountain Shrub	-	60	-	-	60	-	
Broadleaf Trees	-	20	-	-	20	-	
5041 East Gould Reservoir							620
Sagebrush	-	420	200	420	200	-	
5043 Collins							200
Pinyon-Juniper	-	-	200	-	-	200	
5044 Big Pasture							200
Pinyon-Juniper	-	-	120	-	-	120	
Sagebrush	-	-	80	-	-	80	
5045 Black Bullet							90
Pinyon-Juniper	-	-	90	-	90	-	
5046 Big Gulch							440
Pinyon-Juniper	-	-	60	-	60	-	
Desert Shrub	-	-	380	-	380	-	

TABLE 3-9
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5047 Mesa Creek							640
Mountain Shrub	-	300	-	-	300	-	
Conifer	-	340	-	-	340	-	
5048 Morrow Point							1,035
Mountain Shrub	-	155	-	-	155	-	
Conifer	-	880	-	-	880	-	
5049 Smith Fork							450
Pinyon-Juniper	-	450	-	225	225	-	
5050 Allen Reservoir							200
Pinyon-Juniper	-	-	150	-	-	150	
Sagebrush	-	-	50	-	-	50	
5502 Sandy Wash							7,530
Pinyon-Juniper	1,720	4,150	40	3,795	2,115	-	
Waste	-	1,130	490	-	1,620	-	
5503 Green							450
Pinyon-Juniper	-	450	-	225	225	-	
5504 Roatcap							3,070
Pinyon-Juniper	-	1,960	-	980	980	-	
Sagebrush	50	500	-	550	-	-	
Grass	560	-	-	560	-	-	
5505 Transfer							2,970
Pinyon-Juniper	1,250	930	210	1,705	685	-	
Waste	-	-	580	-	580	-	
5507 Pipeline							19,190
Pinyon-Juniper	6,520	5,125	7,305	9,080	9,870	-	
Halfshrub	240	-	-	240	-	-	
5508 Government Springs							2,260
Pinyon-Juniper	580	890	790	1,025	1,235	-	
5509 Coal Creek							320
Halfshrub	320	-	-	320	-	-	
5510 Bald Hills							205
Mountain Shrub	90	-	-	90	-	-	
Sagebrush	115	-	-	115	-	-	
5511 Shavano Mesa							2,015
Pinyon-Juniper	-	605	-	300	305	-	
Sagebrush	-	135	-	135	-	-	
Halfshrub	125	1,150	-	1,275	-	-	
5512 Franklin Mesa							3,600
Pinyon-Juniper	-	225	2,840	120	2,945	-	
Sagebrush	-	60	395	60	395	-	
Grass	-	80	-	80	-	-	
5513 Dry Creek Basin							5,425
Pinyon-Juniper	-	-	3,645	-	3,645	-	
Sagebrush	-	-	1,780	-	1,780	-	
5514 East Fork Dry Creek							135
Pinyon-Juniper	-	-	30	-	-	30	
Mountain Shrub	-	-	5	-	-	5	
Sagebrush	-	-	95	-	-	95	
Broadleaf Trees	-	-	5	-	-	5	
5515 Olathe Reservoir							185
Pinyon-Juniper	100	-	-	100	-	-	
Mountain Shrub	-	-	85	-	-	85	
5516 Piney							8,335
Mountain Shrub	-	2,195	900	2,195	900	-	
Sagebrush	-	-	5,240	-	5,240	-	
5517 Spring Creek							440
Pinyon-Juniper	-	-	440	-	-	440	
5518 Dave Wood							2,565
Pinyon-Juniper	-	440	1,290	820	910	-	
Sagebrush	-	820	15	820	15	-	
5520 Lower Horsefly:							
X Lower Horsefly Subunit							5,675
Pinyon-Juniper	480	2,430	1,180	2,365	1,725	-	
Saltbush	-	-	680	-	680	-	
Sagebrush	-	220	685	220	685	-	
Y Dry Cedar Subunit							4,690
Pinyon-Juniper	-	-	540	270	270	-	
Saltbush	4,150	-	-	4,150	-	-	
5521 Highway 90							6,215
Pinyon-Juniper	860	3,800	1,555	2,760	3,455	-	
5522 Beaver Hill							19,785
Pinyon-Juniper	5,100	7,425	7,260	8,960	10,825	-	
5523 Horsefly							640
Pinyon-Juniper	-	415	225	520	120	-	
5524 Duckett Draw							275
Pinyon-Juniper	-	-	20	-	-	20	
Sagebrush	-	-	255	-	-	255	
5525 Dry Creek							100
Pinyon-Juniper	-	25	-	-	25	-	
Grass	-	75	-	-	75	-	

TABLE 3-9
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5529 Log Hill							4,345
Pinyon-Juniper	2,745	-	80	2,745	80	-	
Mountain Shrub	-	-	1,520	-	1,520	-	
5530 Billy Creek							3,995
Pinyon-Juniper	-	50	2,260	25	2,285	-	
Saltbush	-	-	285	-	285	-	
Mountain Shrub	80	630	265	710	265	-	
Sagebrush	25	-	-	25	-	-	
Grass	85	-	-	85	-	-	
Greasewood	50	245	20	295	20	-	
5532 Burro Ridge							200
Pinyon-Juniper	-	85	35	40	80	-	
Mountain Shrub	-	45	-	45	-	-	
Sagebrush	-	25	10	25	10	-	
5533 Onion Lakes							630
Mountain Shrub	-	-	200	-	-	200	
Conifer	-	430	-	-	430	-	
5534 Shin Park							3,970
Pinyon-Juniper	-	470	-	-	470	-	
Saltbush	-	50	3,450	-	50	3,450	
5535 Cedar Creek							240
Pinyon-Juniper	-	150	20	-	150	20	
Saltbush	-	-	70	-	-	70	
5536 South Canal							2,115
Saltbush	-	-	2,115	-	-	2,115	
5538 Rock Ditch							55
Saltbush	55	-	-	55	-	-	
5540 Dry Gulch							4,860
Pinyon-Juniper	-	225	2,575	110	2,690	-	
Mountain Shrub	-	130	50	130	50	-	
Sagebrush	-	1,545	225	1,545	225	-	
Broadleaf Trees	-	110	-	110	-	-	
5542 Bosgal							50
Saltbush	50	-	-	50	-	-	
5543 Waugh							200
Pinyon-Juniper	-	-	15	-	-	15	
Saltbush	165	20	-	165	20	-	
5544 Kelly							80
Saltbush	80	-	-	80	-	-	
5545 Henshaw							170
Pinyon-Juniper	-	35	-	35	-	-	
Sagebrush	-	135	-	135	-	-	
5546 Waterdog Basin							400
Pinyon-Juniper	-	-	335	-	335	-	
Sagebrush	-	-	65	-	65	-	
5547 Slagle Pass							310
Conifer	-	310	-	-	310	-	
5548 Washboard Rock							760
Mountain Shrub	-	40	-	-	40	-	
Conifer	-	655	-	-	655	-	
Broadleaf Trees	-	10	-	-	10	-	
Grass	-	55	-	-	55	-	
5549 High Park							1,660
Sagebrush	-	40	-	-	40	-	
Conifer	700	650	-	700	650	-	
Barren	-	130	-	-	130	-	
Grass	140	-	-	140	-	-	
5551 Dexter Creek							65
Mountain Shrub	-	-	65	-	-	65	
5552 Dallas							240
Pinyon-Juniper	-	145	35	-	145	35	
Sagebrush	-	15	45	-	15	45	
5553 Fisher Creek							480
Pinyon-Juniper	-	160	-	-	160	-	
Mountain Shrub	-	320	-	-	320	-	
5555 Taylor Draw							325
Pinyon-Juniper	-	-	325	-	-	325	
5556 Burro Creek							120
Pinyon-Juniper	-	-	120	-	-	120	
5557 Alkali							485
Pinyon-Juniper	-	165	275	-	165	275	
Sagebrush	-	20	25	-	20	25	
5559 South Fork							120
Pinyon-Juniper	-	-	30	-	-	30	
Sagebrush	-	-	90	-	-	90	
5560 Cookie Tree							640
Pinyon-Juniper	-	220	-	-	220	-	
Sagebrush	-	-	420	-	-	420	

TABLE 3-9
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5561 East Fork							80
Pinyon-Juniper	-	-	45	-	-	45	
Mountain Shrub	-	-	35	-	-	35	
5562 Hillside							160
Pinyon-Juniper	-	105	-	50	55	-	
Mountain Shrub	-	15	-	15	-	-	
Sagebrush	-	-	40	-	40	-	
5563 Moonshine Park							230
Mountain Shrub	-	-	150	-	-	150	
Conifer	-	-	45	-	-	45	
Broadleaf Trees	-	-	30	-	-	30	
Grass	-	-	5	-	-	5	
5564 Gravel Pit							40
Pinyon-Juniper	-	-	40	-	-	40	
5565 Tommy Creek							120
Pinyon-Juniper	30	-	45	30	-	45	
Desert Shrub	10	-	-	10	-	-	
Mountain Shrub	30	5	-	30	5	-	
5566 Cow Creek							520
Mountain Shrub	-	-	355	-	355	-	
Conifer	-	-	105	-	105	-	
Broadleaf Trees	-	-	60	-	60	-	
5567 Busted Boiler							40
Pinyon-Juniper	40	-	-	40	-	-	
5568 Baldy							680
Mountain Shrub	-	-	255	-	255	-	
Conifer	-	-	195	-	195	-	
Grass	-	-	230	-	230	-	
5569 Hairpin							500
Sagebrush	500	-	-	500	-	-	
5570 Cedar							2,125
Pinyon-Juniper	-	-	1,140	-	1,140	-	
Mountain Shrub	230	-	150	230	150	-	
Sagebrush	130	-	475	130	475	-	
5572 McKenzie Creek							110
Pinyon-Juniper	90	-	20	90	-	20	
5574 Tappan Creek							240
Pinyon-Juniper	-	75	-	-	75	-	
Sagebrush	-	165	-	-	165	-	
Unallotted Parcels							13,550
Pinyon-Juniper	-	4,355	1,235	-	4,355	1,235	
Saltbush	-	40	1,390	-	40	1,390	
Desert Shrub	-	-	350	-	-	350	
Mountain Shrub	640	1,070	-	640	1,070	-	
Sagebrush	560	1,120	2,480	560	1,120	2,480	
Conifer	100	130	-	100	130	-	
Broadleaf Trees	80	-	-	80	-	-	
SUBTOTALS							SUBTOTALS
Pinyon-Juniper	36,300	138,685	95,535	116,235	150,075	4,210	270,520
Saltbush	4,500	13,885	58,115	18,115	51,280	7,105	76,500
Desert Shrub	10	9,895	48,360	9,905	48,010	350	58,265
Mountain Shrub	20,065	25,995	7,165	43,660	8,065	1,500	53,225
Sagebrush	9,670	20,045	19,210	28,455	16,835	3,635	48,925
Conifer	2,195	3,450	420	2,250	3,770	45	6,065
Barren	0	130	4,175	0	4,305	0	4,305
Waste	0	1,130	1,070	0	2,200	0	2,200
Broadleaf Trees	450	610	1,050	1,030	1,045	35	2,110
Halfshrub	685	1,150	0	1,835	0	0	1,835
Grass	785	210	235	865	360	5	1,230
Greasewood	50	245	20	295	20	0	315
Annuals	280	0	0	280	0	0	280
TOTALS	74,990	215,430	235,355	222,925	285,965	16,885	525,775
Summary of Changes				+147,935	+70,535	-218,470	
				+197%	+33%	-93%	

The conifer type, which in the ES area corresponds to the study area's vegetative types, is at the upper elevations of the area with an average of 20 inches precipitation annually. Therefore, it could be assumed that the time necessary for NRL in the area to recover to good range condition would be well over 40 years.

Another study conducted in the northwest in a ponderosa pine-bunchgrass range indicated that shrub and forb production decreased more under protection from cattle grazing (elimination) than under any level of cattle grazing (U.S. Department of Agriculture, no date).

Furthermore, there are eleven exclosures in the ES area on which livestock grazing has been excluded from 10 to 38 years. General observations of these exclosures show that there have been no significant changes (less than 4 percent) in vegetative density or species composition due to elimination of livestock grazing. Thus, it is assumed that by 2006 there would be no changes in range condition, vegetative density, or species composition on the allotments receiving elimination of grazing.

Overall, through the year 2006, it is estimated that there could be 222,925 acres in good range condition, 285,965 acres in fair range condition, and 16,885 acres in poor range condition. These figures represent an increase of 197 percent from acres presently in good range condition, an increase of 33 percent from acres presently in fair range condition, and a decrease of 93 percent from acres presently in poor range condition. These estimates are based upon theory, professional judgment, and extrapolation of trend data for ten allotments in the ES area and studies of other allotments in the Montrose District, including conclusions drawn in published studies by Ratliff, Reppert, and McConnen (1972), Keng and Merrill (1960), and Johnson (1965).

Expected long-term increases in vegetative cover may range from 10 to 20 percent as a result of the proposed action. Vegetative composition may increase from 5 to 20 percent for species such as galleta grass, Indian ricegrass, wheatgrass, fourwing saltbush, and common serviceberry. (Refer to table 3-8). Also by 2006, it is estimated that there may be an additional 12,645 AUMs of forage produced for wildlife and livestock. However, recognizing that predictions regarding future conditions depend on assumptions over which humans may have little control and that much professional judgment and estimation is required, it is the cautious expectation that quality and quantity of forage for livestock and wildlife would be increased by implementation of the proposal.

Range Improvements

Construction of range improvements would temporarily remove about 360 acres from production and permanently remove approximately 25 acres. (For a list of range improvements by allotment, refer to table 1-10; the number of acres disturbed by each type of improvement can be found in table 3-1 under Assumptions and Analysis Guidelines.) Recovery rates for the temporarily removed acres would be closely related to precipitation; however, the average recovery time would be approximately five years for the ES area.

In addition to range improvement construction, there would be 29,610 acres initially disturbed by vegetation manipulations (see acres disturbed columns in table 3-1). For methodology and assumptions made on range condition changes from vegetation manipulations, refer to appendix 4.

The overall impact of chaining and seeding approximately 20,880 acres would be a change in species composition toward more grass and browse species for livestock and wildlife use. The long-term impact would be an increase in forage production from about 100 pounds per acre to 500 pounds per acre (Hurst 1976; Buckhouse and Gifford 1976, p. 300), with an increase in vegetative density from 40 percent to 50 percent. Range condition of these acres would be expected to change from poor and fair to good over the long term.

Interseeding of desirable grass and browse on approximately 8,665 acres would not reduce the percentage of shrub density by more than 5 or 10 percent, but would increase the total plant density of the treated area by approximately 50 percent (Vallentine 1971). Range condition would be expected to improve one class on the acreage receiving this treatment.

Contour furrowing would have a short-term impact of removing the area actually furrowed (approximately 65 acres) from production for not more than eight years. The long-term impact is expected to be a 100 percent increase in the overall plant density of approximately 1,250 acres in two subunits, 5030 V Adobe South subunit and 5520 X Lower Horsefly subunit (Vallentine 1971,

pp. 306-7). Range condition would be expected to change from poor to fair over the long term.

Endangered Plants

The proposed action would have the following impacts on three plants on the proposed Federal Register list of endangered plants (*Echinocereus triglochidiatus* var. *inermis*, *Penstemon retrorsus*, and *Sclerocactus glaucus*) and on *Mimulus eastwoodiae*, which is not proposed for the Federal Register but is very rare in Colorado.

Echinocereus triglochidiatus var. *inermis*.

Livestock grazing in itself is not detrimental to the spineless cactus *Echinocereus triglochidiatus* var. *inermis*. There is no evidence that livestock eat it, and with proper grazing management (no overcrowding of livestock), trampling is not a problem. However, the proposed chaining and seeding on allotment 4010 Monitor Mesa would be harmful to *Echinocereus triglochidiatus* var. *inermis* populations.

Penstemon retrorsus

Livestock grazing would not affect the vigor of *Penstemon retrorsus*, since livestock do not graze this plant. However, the proposed vegetation modification on allotments 5008 Brush Point (interseeding, 2,555 acres) and 5030 Bostwick Park (contour furrowing, 820 acres) would be harmful to *Penstemon retrorsus* populations in that their critical habitat would be disturbed. The purpose of these vegetation modifications is to replace the native range species with plants that are more palatable to livestock. In this case one of the native ranges species is an endangered plant, and the vegetation conversion would be detrimental to that plant.

Sclerocactus glaucus

It is not likely that livestock grazing would harm the populations of *Sclerocactus glaucus*, as it maintains healthy populations in areas that have historically been grazed.

Mimulus eastwoodiae

The proposed action would not affect *Mimulus eastwoodiae*, due to the inaccessible nature of *Mimulus eastwoodiae*'s habitat (water seeps on cliffs of Wingate sandstone).

Summary

Short-term impacts under spring and summer grazing (treatments A and B in rest rotation, deferred rotation, trailing, and some custodial management) will initially decrease plant vigor, reproduction, litter accumulation, and seedling establishment on the part of the area receiving these treatments each year. For fall and winter or dormant season grazing (rest rotation treatments C and D, deferred rotation, deferred, and some of the custodial allotments), short-term impacts will increase reproduction, seed trampling and vigor, and decrease litter accumulation on other areas. Thus rest during the critical growing period will increase vigor, reproduction, seedling establishment, and litter accumulation. (Refer to table 3-7.) Range improvements will result in a loss of 360 acres from vegetative production and 29,610 acres disturbed but returned to production.

Long-term impacts (tables 3-8 and 3-9) expected to occur by 2006 are difficult to predict. However, by 2006, it is estimated that there would be 222,925 acres in good range condition, 285,965 acres in fair range condition, and 16,885 acres in poor range condition. For most of the area, increases in vegetative cover and density are expected. It is estimated that present production could increase from 51,315 AUMs to 63,960 AUMs.

These periods of rest from critical period grazing are expected to more than offset the undesirable short-term effects of treatments A and B.

Echinocereus triglochidiatus var. *inermis* and *Sclerocactus glaucus* could be trampled by livestock. There appear to be no conflicts between livestock grazing and *Penstemon retrorsus* or *Mimulus eastwoodiae*. Vegetation conversions would disturb *Penstemon retrorsus* and *Echinocereus trigolchidiatus* var. *inermis*.

Wildlife

The first half of the wildlife section deals with the impacts of the proposed action on terrestrial wildlife, beginning with impacts on terrestrial wildlife in general. The impacts on the following specific species are then analyzed: mule deer, elk, antelope, mountain lion and black bear, small mammals, waterfowl, upland game birds, raptors, other nongame birds, and endangered species.

The second half of the wildlife section covers aquatic/riparian habitat and wildlife. First the impacts on riparian habitat from livestock grazing are discussed. Second, the major types of impacts on aquatic habitat are summarized, comprising stream bank grazing and trampling, sediment yield, and increased water temperatures. Finally,

the proposed action is analyzed in relation to its impact on each stream within or adjacent to allotments.

A summary of the terrestrial and aquatic/riparian impacts is shown in table 3-17.

Terrestrial

GENERAL IMPACTS

The proposed grazing systems for the ES area include treatments for spring-summer, fall, and winter grazing and for custodial management (see chapter 1). In general the following impacts on wildlife would occur wherever the various treatments are applied; these impacts are summarized in table 3-10 by allotments.

Spring livestock grazing would result in a decrease in browse vigor and reproduction, a reduction of plant growth (see vegetation section), increased competition with big game animals during green-up and with small mammals and birds for forage and related insect species, increased predation on small mammals and birds due to removal of ground cover, and disruption of the life patterns of wildlife.

Fall livestock grazing would reduce available winter forage for big game. In addition, at this time of year, predatory species require prey species in order to teach their young to hunt, young birds need more animal matter (insects), and the young of prey species (small mammals) venture forth. The interrelationships are quite extensive, but all relate to vegetation—or the lack of it.

Winter grazing by livestock could be more accurately described as browsing. All herbivorous animal species turn to browse for maintenance through the winter, and browse use peaks or reaches maximum utilization for all species at this time. This causes a reduction in the amount of forage available to wildlife species. However, rest would allow all forage to be available for wildlife food as well as provide increased cover.

The above treatments, however, cannot be evaluated by themselves but must be considered within the framework of the grazing system. (See Vegetation and Livestock Grazing for complete discussions of the systems.) Under the proposed AMPs, 479,265 acres would have rest as part of the grazing system (rest rotation, deferred rotation, and deferred grazing). The short-term impacts of these systems would be (1) competition during spring grazing between livestock and wildlife on important wildlife winter ranges, (2) reduction of available winter forage for wildlife in pastures previously grazed by livestock, and (3) lack of competition and complete forage availability for wildlife in pastures rested from livestock grazing.

There would be gradual increases in quantity and quality of vegetation (see vegetation section) throughout the ES area, depending on specific site potential. Estimated changes in browse condition twenty years after full implementation of the grazing systems (2006) are shown in tables 3-11 and 3-12 and summarized in table 3-13 for allotments proposed for rest rotation, deferred rotation, and deferred grazing systems (methodology for these tables is located in appendix 5). These gradual increases would provide more forage for grazing animals and small mammals and more nesting sites and cover for birds, resulting in an overall improvement in habitats for most species by 2006. Improved vegetative conditions would also permit general improvement in the health of most wildlife species present, including some potential for increases in numbers of animals present.

Custodial systems would have impacts on the wildlife on 2,510 acres in crucial areas. It is expected in the ES area that wildlife would maintain their present populations on these allotments, as vegetation is not expected to change. In a study by McKean and Bartman (1971), livestock were stocked in spring and fall and deer from November to March (similar to the stocking proposed for custodial management in the ES area). McKean and Bartman found (p. 119) that browse vigor ratings (generally the same as the good, fair, and poor browse condition, tables 2-13, 2-14, and 2-15) were unchanged during the years of their study (1961-1968), except for three of ten pastures where small advances of one rating occurred. Some improvement was evident in the other pastures but not enough to raise the rating.

In the ES area, results similar to those mentioned above are expected under custodial grazing management. There would be some changes evident, but they would be insufficent to raise the areas out of their present browse category in tables 2-13, 2-14, and 2-15. Six transects out of 42 are expected to move into the next higher condition class; however, this would not change either the allotment condition class or the overall condition.

TABLE 3-10
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4006 Dry Mesa:	5511 Shavano Mesa	Rest Rotation (Two Treatments):	
A Escalante Subunit	5512 Franklin Mesa		
4506 Oak Mesa:	5569 Hairpin	Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially between sheep and deer.
G Subunit 1			
5003 Selig Canal:			
S Selig Canal Subunit		Rest from grazing yearlong.	All forage available for wildlife.
4503 Stingley Gulch		Rest Rotation (Two Treatments):	
4516 North Fork:			
K South-of-Hotchkiss Subunit		Utilize forage in spring.	Competition between all grazing species and livestock.
L Hubbard Subunit		Rest from grazing yearlong.	All forage available for wildlife.
5521 Highway 90			
4010 Monitor Mesa	4527 Jumbo Mountain	Rest Rotation (Three Treatments):	
4013 Ben Lowe	4528 Oak Ridge		
4016 Wells Gulch	5008 Brush Point	Utilize forage in spring.	Competition between all grazing species and livestock.
4022 Petrie Mesa	5010 Dead Horse		
E Peach Valley Subunit	5011 Gould Reservoir		
4024 Dirty George	5013 Iron Canyon	Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially between sheep and deer, and between sheep and antelope.
4025 Ward Creek-Doughspoon	5014 Poison Spring		
H Subunit 2	5015 Grizzly Gulch		
4513 Stevens Gulch:	5017 Green Mountain		
I Roatcap Creek Subunit	5020 Black Ridge	Rest from grazing yearlong.	All forage available for wildlife.
J Terror Creek Subunit	5028 Doug Creek		
4516 North Fork:	5030 Bostwick Park		
M Deer Basin Subunit	U Black Canyon-Jones Draw Subunit		
4517 Coal Gulch	5507 Pipeline		
	5529 Log Hill		
	5530 Billy Creek		

Note: This table should be reviewed in conjunction with table 3-7. Impacts of grazing management on browse species were considered in that table while this table deals with impacts on wildlife species.

a/ Short-term impacts on wildlife would begin immediately after the proposal was implemented on a management unit and would last one to three years.

TABLE 3-10
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name	Grazing Systems	Short-Term Impacts of Grazing Systems a/
4012 Canal 4504 Leroux Creek 4507 Jay Creek	Rest Rotation (Four Treatments):	
	Utilize forage in spring.	Competition between all grazing species and livestock.
	Utilize forage in summer.	Reduced winter forage.
	Utilize forage in fall.	Reduced winter forage.
	Rest from grazing yearlong.	All forage available for wildlife.
4001 Dominguez 4006 Dry Mesa: B Dry Mesa Subunit 4017 Alkali Flats 4021 Point Creek 4525 Anthracite Creek 4537 Young's Peak: Q Young's Peak Subunit 5502 Sandy Wash 5503 Green 5504 Roatcap 5508 Government Springs 5520 Lower Horsefly: X Lower Horsefly Subunit 5522 Beaver Hill 5523 Horsefly 5540 Dry Gulch	Rest Rotation (Four Treatments):	
	Utilize forage in spring.	Competition between all grazing species and livestock.
	Utilize forage in fall.	Reduced winter forage.
	Rest from grazing yearlong.	All forage available for wildlife.
	Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially between sheep and deer, and between sheep and antelope.
5516 Piney	Rest Rotation (Five Treatments):	
	Utilize forage in spring.	Competition between all grazing species and livestock.
	Utilize forage in summer.	Reduced winter forage.
	Utilize forage in fall.	Reduced winter forage.
	Rest from grazing yearlong.	All forage available for wildlife.
	Utilize forage in summer.	Reduced winter forage.

TABLE 3-10
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4502 Surface to Leroux 4529 Reynolds Creek 4530 McDonald Mesa 4532 McDonald Ranch: N Lambing Shed Subunit 4540 North Saddle Peak 4549 Dry Creek	5016 Black Canyon 5029 Spring Gulch 5030 Bostwick Park: V Adobe South Subunit 5570 Cedar	Deferred Rotation: Utilize forage in spring. Defer grazing one growing season, and utilize forage in fall.	Competition between all grazing species and livestock. Defer: Forage available for wildlife. Graze: Reduced winter forage.
5566 Cow Creek		Deferred Rotation: Utilize forage in spring. Defer grazing one growing season, and utilize forage in fall. Utilize forage in summer.	Competition between all grazing species and livestock. Defer: Forage available for wildlife. Graze: Reduced winter forage. Reduced winter forage.
4002 Lower Escalante 4007 Sawmill Mesa 4008 25 Mesa 4022 Petrie Mesa F Petrie Mesa Subunit 4532 McDonald Ranch: O South-of-Town Subunit P Harrington Subunit 5049 Smith Fork	5505 Transfer 5513 Dry Creek Basin 5518 Dave Wood 5520 Lower Horsefly: Y Dry Cedar 5532 Burro Ridge 5534 Shin Park 5562 Hillside 5568 Baldy	Deferred: Defer grazing during growing season, and utilize forage in fall or winter each year.	Defer: Forage available for wildlife. Graze: Reduced winter forage; competition between species, especially between sheep and deer.
4011 Lower Roubideau		Trailing: Utilize forage spring and fall each year.	Reduce available forage for wildlife. Competition in the spring.

TABLE 3-10
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name		Grazing Systems	Short-Term Impacts of Grazing Systems a/
4026 Escalante Canyon	5533 Onion Lakes	Custodial:	
4501 Milk Creek	5536 South Canal		
4514 Upper Terror Creek	5538 Rock Ditch	Utilize forage in fall and/or	Reduce available forage for wildlife.
4535 Home Place	5542 Bosgal	winter.	Competition between livestock and wildlife
5022 Rabbit Gulch	5543 Waugh		in the winter.
5026 Star Nelson	5544 Kelly		
Airport	5545 Henshaw		
5036 Big Gulch	5547 Slagle Pass		
5045 Black Bullet	5564 Gravel Pit		
5525 Dry Creek	5567 Busted Boiler		
4005 Fall Cabin	4541 Sunshine Mesa	Custodial:	
4006 Dry Mesa:	4543 South Saddle		
C Smith Ranch Subunit	Peak	Utilize forage season-long,	Reduce available forage for wildlife.
D Escalante Creek	4548 Creek Bottom	spring and fall, or most of	Competition between livestock and wildlife
Subunit	5002 Dedication Site	the growing season.	in the spring.
4014 Joker	5003 Selig Canal:		
4015 White Ranch	T Rawhide-Coffeepot		
4505 Juniper Knob	Subunit		
4509 Upper Jay Creek	5012 Cedar Point		
4511 Overland	5025 Fruitland Mesa		
4512 East Roatcap	5027 Adobe		
4515 Freeman Gulch	5030 Bostwick Park:	5509 Coal Creek	
4518 Pilot Creek	W Bostwick Park	5510 Bald Hills	
4519 Muddy Creek	Subunit	5514 East Fork Dry Creek	
4520 Spring Creek	5033 Pinyon Springs	5515 Olathe Reservoir	
4521 Stock Driveway	5038 Red Canyon	5517 Spring Creek Canyon	
4522 Downing	5039 Onion Valley	5524 Duckett Draw	
4523 Williams Creek	5040 Pine Ridge	5535 Cedar Creek	
4524 Deep Creek	5041 East Gould	5546 Waterdog Basin	
4526 Crystal Creek	Reservoir	5548 Washboard Rock	
4531 Popp Ranch	5043 Collins	5549 High Park	
4536 West Young's Peak	5044 Big Pasture	5551 Dexter Creek	
4537 Young's Peak:	5046 Big Gulch	5561 East Fork	
R Crawford Subunit	5047 Mesa Creek	5563 Moonshine Park	
4538 Missouri Flats	5048 Morrow Point	5565 Tommy Creek	
4539 Cottonwood Creek	5050 Allen Reservoir	5574 Tappan Creek	
5037 Black Mesa	5557 Alkali	Elimination of grazing:	
5552 Dallas	5559 South Fork		
5553 Fisher Creek	5560 Cookie Tree	No livestock grazing.	All forage available for wildlife.
5555 Taylor Draw	5572 McKenzie Creek		
5556 Burro Creek			

TABLE 3-11

PREDICTED FUTURE BROWSE CONDITION IN THE DEER CRUCIAL AREAS (BY 2006)

Crucial Area	Allotment Name and Number	Present Condition (Acres) Good	Fair	Poor	Predicted Condition (by 2006) (Acres) Good	Fair	Poor	Total Acres
Deer Basin	4017 Alkali Flats, Pipeline Pasture	-	80	240	-	80	240	320
	4516 North Fork, Deer Basin Pasture	-	240	720	-	240	720	960
Negro Mesa	4017 Alkali Flats, Pipeline Pasture	-	120	120	-	120	120	240
	4025 Ward Creek-Doughspoon, Pasture 4	-	-	240	-	-	240	240
Oak Creek	4024 Dirty George, South Branch Pasture	-	800	-	-	800	-	800
	4025 Ward Creek-Doughspoon, Pasture 1	-	-	840	-	-	840	840
Camp Ridge	4001 Dominguez	-	4,390	10,970	1,075	4,390	9,895	15,360
Dry Mesa	4006 Dry Mesa: Subunit B	-	2,415	6,065	595	2,415	5,470	8,480
Cottonwood Mesa	4005 Fall Cabin	-	100	260	-	100	260	360
	4007 Sawmill Mesa	-	525	1,315	130	525	1,185	1,840
	4008 25 Mesa	-	170	430	40	170	390	600
Monitor Mesa	4010 Monitor Mesa	-	935	2,345	230	935	2,115	3,280
	4014 Joker	-	160	400	-	160	400	560
Winter Mesa	4010 Monitor Mesa	-	1,275	3,205	315	1,275	2,890	4,480
Camel Back	4012 Canal, Pasture 4	-	240	600	60	240	540	840
Pea Green	4012 Canal, Pastures 3 & 4	-	355	885	85	355	800	1,240
	4013 Ben Lowe, Ben Lowe & Cedar Pastures	-	605	1,515	150	605	1,365	2,120
Leroux Creek	4503 Stingley Gulch	-	540	540	-	540	540	1,080
	4549 Dry Creek	-	300	900	-	300	900	1,200
Horse Park	4504 Leroux Creek	-	395	1,200	-	395	1,200	1,595
	4506 Oak Mesa: Subunit G	-	80	240	-	80	240	320
	Subunit H	-	190	560	-	190	560	750
Oak Mesa	4507 Jay Creek	-	585	1,755	-	585	1,755	2,340
	4509 Upper Jay Creek	-	60	180	-	60	180	240
Wakefield Mesa	4507 Jay Creek	-	400	1,200	-	400	1,200	1,600
	4511 Overland	-	-	160	-	-	160	160
	4512 East Roatcap	-	-	30	-	-	30	30
	4513 Stevens Gulch: Subunit I Roatcap	-	230	690	-	230	690	920
Fry Mesa	4513 Stevens Gulch: Subunit I Roatcap	-	80	240	-	80	240	320
	Subunit J Terror Creek	-	190	570	-	190	570	760
Terror Creek	4513 Stevens Gulch: Subunit J Terror Creek	-	430	1,290	-	430	1,290	1,720
	4515 Freeman Gulch	-	-	320	-	-	320	320
Paonia Reservoir	4525 Anthracite Creek	-	170	510	-	170	510	680
Minnesota Creek	4527 Jumbo Mountain	-	540	1,620	-	540	1,620	2,160
	4528 Oak Ridge	-	130	390	-	130	390	520
Reynolds Creek	4529 Reynolds Creek	-	270	810	-	270	810	1,080
	4530 McDonald Mesa	-	510	1,530	-	510	1,530	2,040
	4537 Young's Peak: Subunit Q Young's Peak	-	70	210	-	70	210	280
Fruitland Mesa	5011 Gould Reservoir	270	840	570	270	840	570	1,680
	5012 Cedar Point	20	60	40	20	60	40	120
	5013 Iron Canyon	-	230	690	-	230	690	920
	5014 Poison Springs	-	-	1,450	-	-	1,450	1,450
	5017 Green Mountain	-	11,760	1,680	-	11,760	1,680	13,440
	5038 Red Canyon	-	-	80	-	-	80	80
	5039 Onion Valley	-	-	40	-	-	40	40

Note: No changes are predicted for elk crucial areas. Methodology for this table is located in appendix 5.

TABLE 3-11
PREDICTED FUTURE BROWSE CONDITION IN THE DEER CRUCIAL AREAS (BY 2006) (cont.)

Crucial Area	Allotment Name and Number	Present Condition (Acres) Good	Fair	Poor	Predicted Condition (by 2006) (Acres) Good	Fair	Poor	Total Acres
Black Ridge	4516 North Fork: Subunit M Deer Basin, Smith Fork Pasture	595	1,860	1,270	595	1,860	1,270	3,725
	5020 Black Ridge	1,100	3,435	2,340	1,100	3,435	2,340	6,875
	5022 Rabbit Gulch	-	825	425	-	825	425	1,250
Dry Fork Escalante	5502 Sandy Wash	-	730	1,830	180	730	1,650	2,560
	5505 Transfer	-	570	1,430	140	570	1,290	2,000
	5507 Pipeline	770	-	2,310	770	770	1,540	3,080
	5513 Dry Creek Basin	-	500	1,260	125	500	1,135	1,760
	5516 Piney	-	680	-	680	-	-	680
Highway 90	5507 Pipeline	1,340	-	4,020	1,340	1,340	2,680	5,360
	5521 Highway 90, Pastures 4 & 6	-	280	720	70	280	650	1,000
Happy Canyon	5517 Spring Creek Canyon	-	125	315	30	125	285	440
	5522 Beaver Hill	-	-	2,160	-	-	2,160	2,160
Along Highway 550	5529 Log Hill	-	-	120	-	-	120	120
	5530 Billy Creek	-	-	240	-	-	240	240
	5552 Dallas	-	-	80	-	-	80	80
	5553 Fisher Creek	-	480	-	-	480	-	480
	5557 Alkali	-	-	160	-	-	160	160
	5560 Cookie Tree	-	-	280	-	-	280	280
	5572 McKenzie Creek	-	-	110	-	-	110	110
Cerro Summit	5003 Selig Canal: Subunit T Rawhide-Coffeepot	480	-	-	480	-	-	480
	5569 Hairpin	-	140	360	35	140	325	500
TOTALS		4,575	40,095	69,075	8,515	41,525	63,705	113,745

TABLE 3-12
PREDICTED FUTURE BROWSE CONDITION IN THE NONCRUCIAL AREAS (BY 2006)

Allotment Name & Number	Present Acres			Predicted Acres (By 2006)			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
4001 Dominguez	-	13,660	34,275	3,355	13,660	30,920	47,935
4002 Lower Escalante	-	480	1,210	120	480	1,090	1,690
4006 Dry Mesa	-	4,255	10,680	1,045	4,255	9,635	14,935
4007 Sawmill Mesa	-	3,220	8,075	790	3,220	7,285	11,295
4008 25 Mesa	-	2,155	5,410	530	2,155	4,880	7,565
4010 Monitor Mesa	-	4,360	10,935	1,070	4,360	9,865	15,295
4012 Canal	-	1,225	3,065	300	1,225	2,765	4,290
4013 Ben Lowe	-	750	1,885	185	750	1,700	2,635
4014 Joker	-	525	1,310	-	525	1,310	1,835
4015 White Ranch	-	120	295	-	120	295	415
4016 Wells Gulch	-	305	755	-	305	755	1,060
4017 Alkali Flats	-	2,820	7,080	-	2,820	7,080	9,900
4022 Petrie Mesa	-	1,940	4,865	-	1,940	4,865	6,805
4024 Dirty George	-	2,385	-	-	2,385	-	2,385
4025 Ward Creek-Doughspoon	-	-	4,230	-	-	4,230	4,230
4026 Escalante Canyon	-	305	755	-	305	755	1,060
4501 Milk Creek	-	30	75	-	30	75	105
4502 Surface to Leroux	-	805	2,425	-	805	2,425	3,230
4503 Stingley Gulch	-	270	810	-	270	810	1,080
4504 Leroux Creek	-	640	1,915	-	640	1,915	2,555
4505 Juniper Knob	-	-	120	-	-	120	120
4506 Oak Mesa	-	335	1,015	-	335	1,015	1,350
4507 Jay Creek	-	2,300	6,905	-	2,300	6,905	9,205
4509 Upper Jay Creek	-	105	325	-	105	325	430
4511 Overland	-	40	120	-	40	120	160
4512 East Roatcap	-	-	30	-	-	30	30
4513 Stevens Gulch	-	1,635	4,920	-	1,635	4,920	6,555
4514 Upper Terror Creek	-	-	30	-	-	30	30
4515 Freeman Gulch	-	155	465	-	155	465	620
4516 North Fork	-	2,125	6,365	-	2,125	6,365	8,490
4517 Coal Gulch	-	1,705	5,115	-	1,705	5,115	6,820
4518 Pilot Creek	-	-	45	-	-	45	45
4519 Muddy Creek	-	125	375	-	125	375	500
4520 Spring Creek	-	30	90	-	30	90	120
4521 Stock Driveway	-	30	90	-	30	90	120
4522 Downing	-	30	90	-	30	90	120
4523 Williams Creek	-	25	85	-	25	85	110
4524 Deep Creek	-	-	15	-	-	15	15
4525 Anthracite Creek	-	260	780	-	260	780	1,040
4526 Crystal Creek	-	110	335	-	110	335	445
4527 Jumbo Mountain	-	995	2,995	-	995	2,995	3,990
4528 Oak Ridge	-	900	2,700	-	900	2,700	3,600
4529 Reynolds Creek	-	300	900	-	300	900	1,200
4530 McDonald Mesa	-	575	1,730	-	575	1,730	2,305
4531 Popp Ranch	-	65	200	-	65	200	265
4532 McDonald Ranch	-	440	1,320	-	440	1,320	1,760
4536 West Young's Peak	-	25	85	-	25	85	110
4537 Young's Peak	-	630	1,890	-	630	1,890	2,520
4538 Missouri Flats	-	30	90	-	30	90	120
4539 Cottonwood Creek	-	30	90	-	30	90	120
4540 North Saddle Peak	-	60	180	-	60	180	240
4541 Sunshine Mesa	-	-	40	-	-	40	40
4543 South Saddle Peak	-	55	165	-	55	165	220
4549 Dry Creek	-	775	2,335	-	775	2,335	3,110
5002 Dedication Site	305	960	650	305	960	650	1,915
5003 Selig Canal	3,265	-	-	3,265	-	-	3,265
5008 Brush Point	-	-	5,775	-	-	5,775	5,775
5010 Dead Horse	155	475	325	155	475	325	955
5011 Gould Reservoir	450	1,415	960	450	1,415	960	2,825
5012 Cedar Point	100	310	210	100	310	210	620

Note: Methodology for this table is located in appendix 5. This table includes only allotments with pinyon-juniper, sagebrush, or mountain shrub. In addition, this table includes some, but not all, of the allotments located in crucial areas. Allotments that fall entirely within crucial areas are not included but can be found in table 3-11, which provides a breakdown by crucial area. Table 3-13 is a summary table for predicted future browse condition.

TABLE 3-12
PREDICTED FUTURE BROWSE CONDITION IN THE NONCRUCIAL AREAS (By 2006)(Cont.)

Allotment Name & Number	Present Acres			Predicted Acres (By 2006)			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5013 Iron Canyon	-	-	1,335	-	-	1,335	1,335
5014 Poison Spring	-	1,570	-	-	1,570	-	1,570
5015 Grizzly Gulch	-	-	1,930	-	-	1,930	1,930
5016 Black Canyon	70	220	150	70	220	150	440
5017 Green Mountain	-	18,220	2,605	-	18,220	2,605	20,825
5025 Fruitland Mesa	-	80	-	-	80	-	80
5027 Adobe	50	150	100	50	150	100	300
5028 Doug Creek	65	200	135	65	200	135	400
5029 Spring Gulch	210	660	450	210	660	450	1,320
5030 Bostwick Park	330	1,030	705	330	1,030	705	2,065
5033 Pinyon Spring	-	1,030	-	-	1,030	-	1,030
5037 Black Mesa	60	180	120	60	180	120	360
5040 Pine Ridge	-	30	30	-	30	30	60
5041 East Gould Reservoir	100	310	210	100	310	210	620
5043 Collins	30	100	70	30	100	70	200
5044 Big Pasture	30	100	70	30	100	70	200
5045 Black Bullet	-	70	20	-	70	20	90
5046 Big Gulch	-	30	30	-	30	30	60
5047 Mesa Creek	50	150	100	50	150	100	300
5048 Morrow Point	25	75	55	25	75	55	155
5049 Smith Fork	70	225	155	70	225	155	450
5050 Allen Reservoir	30	100	70	30	100	70	200
5502 Sandy Wash	-	1,685	4,225	415	1,685	3,810	5,910
5503 Green	-	130	320	30	130	290	450
5504 Roatcap	-	715	1,795	175	715	1,620	2,510
5505 Transfer	-	680	1,710	170	680	1,540	2,390
5507 Pipeline	4,740	-	14,210	4,740	4,740	9,470	18,950
5508 Government Springs	-	645	1,615	160	645	1,455	2,260
5510 Bald Hills	-	60	145	-	60	145	205
5511 Shavano Mesa	-	210	530	50	210	480	740
5512 Franklin Mesa	-	1,000	2,520	245	1,000	2,275	3,520
5513 Dry Creek Basin	-	-	5,425	-	-	5,425	5,425
5514 East Fork Dry Creek	-	40	90	-	40	90	130
5515 Olathe Reservoir	-	55	130	-	55	130	185
5516 Piney	-	8,335	-	-	8,335	-	8,335
5518 Dave Wood	-	730	1,835	180	730	1,655	2,565
5520 Lower Horsefly	-	5,535	-	-	5,535	-	5,535
5521 Highway 90	-	1,770	4,445	435	1,770	4,010	6,215
5522 Beaver Hill	-	-	19,785	-	3,960	15,825	19,785
5523 Horsefly	-	185	455	45	185	410	640
5524 Duckett Draw	-	80	195	-	80	195	275
5525 Dry Creek	-	-	25	-	-	25	25
5529 Log Hill	-	-	4,345	-	-	4,345	4,345
5530 Billy Creek	-	-	3,310	-	-	3,310	3,310
5532 Burro Ridge	-	60	140	15	60	125	200
5533 Onion Lakes	-	60	140	15	60	125	200
5534 Shin Park	-	135	335	35	135	300	470
5535 Cedar Creek	-	50	120	-	50	120	170
5540 Dry Gulch	-	-	4,690	-	-	4,690	4,690
5543 Waugh	-	-	15	-	-	15	15
5545 Henshaw	-	50	120	10	50	110	170
5546 Waterdog Basin	-	115	285	30	115	255	400
5548 Washboard Rock	-	-	40	-	-	40	40
5549 High Park	-	-	40	-	-	40	40
5551 Dexter Creek	-	-	65	-	-	65	65
5552 Dallas	-	70	170	-	70	170	240
5555 Taylor Draw	-	-	325	-	-	325	325
5556 Burro Creek	-	35	85	-	35	85	120
5557 Alkali	-	-	485	-	-	485	485
5559 South Fork	-	35	85	-	35	85	120
5560 Cookie Tree	-	-	640	-	-	640	640
5561 East Fork	-	-	80	-	-	80	80
5562 Hillside	-	45	115	10	45	105	160
5563 Moonshine Park	-	40	110	-	40	110	150
5564 Gravel Pit	-	-	40	-	-	40	40
5565 Tommy Creek	-	30	80	-	30	80	110
5566 Cow Creek	-	100	255	25	100	230	355
5567 Busted Boiler	-	-	40	-	-	40	40
5568 Baldy	-	70	185	-	70	185	255
5570 Cedar	-	605	1,520	150	605	1,370	2,125
5574 Tappan Creek	-	70	170	-	70	170	240
TOTALS	10,135	105,255	235,830	19,725	113,955	217,540	351,220

TABLE 3-13
SUMMARY TABLE FOR FUTURE BROWSE CONDITION (BY 2006)

Species	Type of Area	Present Condition (Acres) Good	Fair	Poor	Predicted Condition (by 2006) (Acres) Good	Fair	Poor	Total Acres
Deer	Crucial	4,575	40,095	69,075	8,515	41,525	63,705	113,745
Deer	Noncrucial	10,135	105,255	235,830	19,725	113,955	217,540	351,220

Note: This table will not total to the bottom due to the repetition of allotments.
No change is expected in elk crucial areas.

Nine allotments (totaling 3,020 acres, with total grazing privileges of 226 AUMs) are proposed for elimination of grazing. Of these, 1,110 acres and 138 AUMs are in deer crucial areas. Elimination of grazing would eliminate any competition between wildlife and livestock. The amount of forage and cover made available for wildlife, however, would depend on the amount of traditional livestock use and the relative importance of the allotment for wildlife habitat.

The majority of the livestock elimination would occur in areas adjacent to the proposed Bureau of Reclamation (USBR) Dallas project. These lands have been designated as wildlife areas by USBR. Wildlife use would increase for a short time as more forage is available; however, due to the small acreage involved and the fact that part of these lands would be inundated, populations of wildlife are not expected to increase.

Deer and elk use large acreages of deeded land aong with public lands during the winter. Any change in the management of these lands would directly affect big game herds using public lands.

The proposed improvements and vegetation manipulations (listed in table 1-10) would temporarily disturb approximately 29,970 acres of vegetation, which provides food and cover for wildlife. The long-term loss of habitat is considered insignificant when compared with the total amount of habitat available. All mobile animals would be displaced temporarily. Immobile animals, small mammal and snake dens, and ground nests of birds would be destroyed within the 29,970 acres that would be disturbed.

Water developments throughout the ES area would greatly improve wildlife habitat by inducing a more equitable distribution of livestock, thereby lessening the competition for forage by providing water in previously dry areas, increasing the amount of habitat that is usable; by providing more water bodies for waterfowl nesting, brooding, and resting; and by increasing habitat for amphibians.

Operation of pumpwell motors could disturb wildlife, but the animals would most likely become accustomed to the sound. The habitat inundated by reservoirs would be destroyed for the life of the project, but reservoirs would provide 87 seasonal sources of water for wildlife. Water catchments and storage tanks would provide a more stable source of water in marginal areas of the ES area by storing water and allowing the flow to be regulated by float valves in the troughs. Water troughs serviced by the proposed pipelines would be additional seasonal wildlife watering areas. However, during the life of the project, trampling by livestock would continue to destroy vegetation, which had provided food and cover for wildlife, in the immediate vicinity of the trough.

Long-term impacts of chaining and seeding and of interseeding would be increased vegetative cover and forage for wildlife. Long-term impacts of contour furrowing would be increased vegetative growth from seeding and accelerated growth from other plants as a result of water percolation.

In the following discussion of impacts on specific species, the percentage increase would be to what is thought to be the optimum production levels for the ES area. Optimum wildlife production can be defined as the maximum number of animals being produced by a relatively stable base population.

BIG GAME

Mule Deer

Mule deer begin eating the green shoots of grasses as soon as they appear in the spring; this increases the amount of competition between mule deer and livestock, because all grazing animals are eating these shoots. As competition increases, the amount of energy expended to locate these shoots can put the deer under an additional stress that could cause the death of old or weakened animals and the resorption of fetuses in pregnant does. Weakened fawns could be born if the doe can get enough nutrients to develop the fetus adequately, but these fawns may not survive. The allotments where this could occur are in the crucial areas where spring grazing occurs. (Table A-11 in appendix 5 shows proposed allotments, livestock class, and season of use in deer crucial areas.)

Summer grazing in the ES area results in some competition with some small resident deer herds, although most mule deer are up on national forest lands (NFL). In addition, summer grazing would reduce the amount of available winter forage in the crucial areas where it occurs (4012 Canal, 4504 Leroux Creek, 4507 Jay Creek, 4512 East Roatcap, 5020 Black Ridge, and 5516 Piney; 11,920 crucial area acres; AUMs: cattle-2,479, sheep-400, domestic horses-17). Cattle begin eating browse in July as grasses and forbs lose their

palatability, while sheep diets and deer diets overlap all year. This grazing would reduce winter forage.

In the fall, the mule deer begin to appear on NRL. Mule deer fawns are weaned in September, and weaning time is critical because suitable green forage must be available (U.S. Department of the Interior 1974). In addition, food condition during the summer and fall preceding the mating season appears to be a major factor controlling the number of fawns developing per mule deer doe (U.S. Department of the Interior 1974). A deficiency in this nutritional requirement reduces the reproductive capacity of the herd.

Livestock begin to take more browse in the fall as the succulent forbs and grasses decline in palatability. This increased browsing reduces the amount available to fawns and does. Fall livestock grazing occurs on all crucial areas as shown on table A-11 (appendix 5) but not on all acres because of the nature of the proposed grazing systems. Summer and fall livestock grazing also reduces the amount of winter forage that would be available for wildlife.

Winter is the most critical time of the year for mule deer in the ES area; it is also the time of year when they are present on NRL in the greatest numbers. Therefore, forage availability and abundance on NRL at this time of year is the most important. Concentration (crucial) areas have been identified and are presented in table 3-11 with their browse condition. Eight allotments in crucial areas have proposed winter grazing: 4001 Dominguez, 4006 Dry Mesa, 4008 25 Mesa, 4017 Alkali Flats, 4516 North Fork, 5002 Sandy Wash, 5513 Dry Creek Basin, and 5522 Beaver Hill. Of these, five are sheep allotments, and six are proposed for rest rotation systems and two for deferred systems. These allotments account for 28 percent of the crucial areas acreage (32,440 acres), about one-half of which (15,360 acres) is in 4001 Dominguez allotment (rest rotation-cattle).

The reduction of available forage could cause the older and weakened deer to succumb to the rigors of winter stress and could also reduce the reproduction of the herd. Does, if wintered on inadequate food, may lose about 30 percent of their fawns even if spring foods are plentiful (U.S. Department of the Interior 1974). The greatest impacts in the ES area would be in sheep allotments in crucial areas (10,765 acres, 5,282 AUMs).

Rest rotation, deferred rotation, and deferred systems have rest built into the systems. In the rested pastures, all forage and, in pastures where grazing has been deferred, all regrowth are available for wildlife food and cover. It is expected that these periods of rest would offset the impacts identified earlier.

McKean and Bartman (1971, pg. 61), utilizing proper use as determined by range survey, found that sheep and deer do not significantly compete under proper use. Range survey data were also used in the ES area to determine proper use, and these figures were utilized in determining the proposed action. Therefore, no significant competition (more than 25 percent browse in sheep diet) would occur under the proposed action. It should be noted further that the periods of use utilized in the above study correspond to the proposed custodial systems. Rest rotation, deferred rotation, and deferred systems are expected to reduce the competition even further.

Deer are creatures of habit and will return to the same areas year after year (Taylor 1956; Tueller and Monroe, no date). Because of this tendency, deer have been known to starve to death in an overutilized area almost within view of adequate forage. This is not expected to occur in the ES area because of the rest that will allow browse to recover from livestock grazing. Mule deer have been found to utilize pastures where livestock grazing has occurred because of the deer's preference for grazing in areas where stubble has been removed (U.S. Department of the Interior 1974).

Elimination of grazing on 3,020 acres (226 AUMs) would primarily affect deer. The allotments in the crucial areas (1,110 acres, 138 AUMs) would have increased use for a short while until this area is inundated and then use would decrease. Mule deer populations on these allotments are not expected to increase.

Short-term increases in the population of deer are not expected to be significant; however, as the forage available increases the population over the long term would show the greatest amount of change. Twenty years after full implementation (2006) the mule deer populations are expected to increase by 2,200 to 4,500 wintering deer (15 to 30 percent of the present population). This would be brought about by the increase in vigor and health of browse plants for the mule deer; by a more equitable distribution of livestock by range im-

provements; and by the projected vegetation increases in the ES area.

Elk

The short-term impacts of the grazing management systems on the elk are identified in table 3-10. In the ES area, there are no areas where elk are present in the late spring, summer, or early fall; therefore, the impacts of livestock grazing would be directly on the amount of winter forage available for the elk. (Table A-12 in appendix 5 shows elk crucial winter areas with proposed allotments, livestock class, and season of use).

Browse condition in the elk crucial areas is not expected to change. Generally, however, there would be a reduction of forage in the pastures being grazed in any given year. It should be noted that on allotments 4509 Upper Jay Creek, 4515 Freeman Gulch, and 4520 Spring Creek, rest is not provided in the grazing management systems; these allotments comprise 700 acres of the elk crucial areas and would supply 144 AUMs of cattle use. All other allotments have some rest built into their systems. The rested pastures and all growth after spring grazing would be available for the elk to use since the systems are designed not to use the same pasture for spring and fall grazing the same year. Fall livestock grazing would also directly affect the elk because of the lack of regrowth before the elk move into an area.

Small elk populations in the ES area do not place extreme pressure on the vegetation in these rested pastures. The ability of elk to tolerate deeper snows allows them to stay in higher elevation areas in the winter and to move up country earlier than cattle in the spring. Under the deferred rotation systems proposed for elk crucial areas (1,200 acres; 313 AUMs) cattle would be in some portion of the allotment during the year.

Short-term increases in the population of elk are not expected to be significant; however, as the forage available increases, the population over the long term would show the greatest amount of change. Long-term population increases under the proposed grazing management systems are expected to be 96 to 156 wintering elk (8 to 13 percent of the present population) by 2006. Increased forage and improved livestock distribution would be responsible for these increases.

Deer and Elk

Short-term impacts of fence construction are not significant but new fences tend to disorient big game species. Initially, as many as ten deer a year could die as a result of entanglement in new fences. After the animals become used to these new fences this loss would decrease. Entanglement often occurs when animals are weak due to stresses, such as winter starvation, and are unable to jump high enough. An estimated average of five deer would die annually as a result of entanglements in the fences over the long term.

Short-term impacts of all vegetation projects would be a decrease in the amount of forage and cover for big game and disruption of life patterns, causing an additional energy drain and stress on wildlife. These short-term impacts would occur only once; they would not be repeated year after year. However, the decreased forage and cover for big game animals would take time to be reestablished, and during this period there would be increased competition with livestock for remaining forage.

The greatest impacts on elk and deer would be generated by the proposed chainings and seedings. A drastic vegetation change would occur in a very short period of time and involve a large acreage (20,880). At present the majority of the pinyon-juniper in the ES area is in almost pure stands with very little, if any understory. This is not the best habitat for big game. Deer and elk are successional wildlife and do best on areas maintained at subclimax levels by logging, fire, grazing, or other vegetative disturbance (Taylor 1956; Dasman 1964; Leopold 1966; and Tueller and Monroe, no date). Chaining would produce these subclimax stages. Therefore, they would result in an increase in big game forage and a corresponding increase in numbers of wildlife. (See Vegetation for amount of vegetation production; these figures were taken into consideration when population changes for the area were predicted.)

Antelope

Antelope inhabit portions of NRL yearlong. The crucial areas of allotments 4016 Wells Gulch and 4017 Alkali Flats would be utilized by livestock in spring, fall, and winter, and they are proposed for rest rotation systems. Under spring grazing, competition would exist in the antelope area where sheep are being grazed. This would also affect the young antelope later in the year because this would remove most of the available forbs and grass.

Fall grazing includes the time when antelope fawns are being weaned. Grazing at this time reduces the amount of forage for the young antelope. This is especially critical because young antelope require adequate green forage for survival.

Winter grazing produces the most competitive time of year, especially where sheep and antelope share the same wintering ground as they would one year out of three in 4016 Wells Gulch and one year out of four on 4017 Alkali Flats. The length of time between periods of winter sheep use reduces this competition.

Short-term increases in the population of antelope are not expected to be significant; however, as the forage available increases, the population over the long term would show the greatest amount of change. With the projected increases in vegetation, the better distribution of livestock, and the reduced competition because of the rest rotation systems proposed, the antelope are expected to increase 53 to 73 animals (21 to 29 percent) over the long term (by 2006).

Mountain Lion and Black Bear

Mountain lion are indirectly affected by livestock grazing to the extent that grazing affects mule deer populations, their primary food source. Any population estimates in the ES area are purely speculative, but with an increase in its food the mountain lion could be expected to increase.

Black bear are also indirectly affected by livestock grazing to the extent that the small mammals are affected. There may be an additional small impact on the black bear due to its omnivorous diet, which includes plant species which may or may not be grazed by livestock.

Long-term impacts on black bear and mountain lion would be closely linked to impacts on their prey species, which are affected by the proposed grazing management systems. As the prey population increases the predators also increase, and as the prey population decreases so do the predators. Thus, both prey and predator species are prevented from expanding beyond natural limits.

SMALL MAMMALS

Removal of plant growth would also increase livestock competition with small mammals, since the majority of small mammals are either herbivorous (plant-eating) or insectivorous (insect-eating). Livestock grazing directly reduces the food supply of small herbivorus mammals, and it indirectly reduces the food supply of small insectivores through the removal of plants that are required for the development of insect populations upon which many small mammals feed. The extent of this impact is not known, but small mammals and insects have been found to be more numerous where grasses and forbs provide substantial cover and there is a good density of herbaceous vegetation. The plants most favored by small mammals are those that are generally unpalatable to livestock and increase under some grazing treatments. Animal matter in the form of insects is a basic necessity for the survival of some species of mammals. Moreover, the removal of vegetation would cause an additional energy drain as small mammals expand their ranges in search of food.

Grazing also directly affects small mammals by reducing the amount of vegetation where most of the animals live. Population decreases are directly proportional to the amount of habitat lost through vegetation removal. The removal of ground cover could also increase predation on small mammals and birds, which could be considered a detriment to prey species but a benefit to aerial and ground predators. This situation would be more prevalent on overgrazed areas; however, it is not expected to occur in the ES area due to the grazing system to be implemented.

The predator species such as coyote, bobcat, and all the furbearers are indirectly affected by grazing because their prey species—small mammals—are directly affected by the removal of herbaceous growth by livestock. The varmints—prairie dog, jackrabbit, raccoon, and porcupine—are more directly affected because they are dependent upon herbaceous growth.

Fencing to exclude livestock from reservoir shorelines, water catchments, and storage tanks would allow these areas to be utilized by small mammals without removing all of the vegetation. Seep areas created by the overflow pipe from each proposed watering trough would also create excellent watering places for small mammals. However, small mammals could drown in the troughs when attempting to drink, even though ladders in each trough are designed to provide drinking perches and a means of escape.

One-time impacts of all revegetation projects when they are implemented would be destruction of immobile small animals, nests, burrows, and (depending on the time of year) young mammals,

and disruption of life patterns, causing an additional energy drain and stress on wildlife. In addition, the proposed chainings and reseedings would have more extensive impacts. Cottontails concentrate in chained areas, primarily because of the increase in cover and food as the regrowth begins (McKean and Baker 1972, p. 26). Baker and Frischknecht (1973) found that deer mice and long-tailed voles increase greatly on chained and seeded areas. Due to the increased population of small mammals and the decreased cover the hunting success of ground predators would be increased, too.

Even though impacts as stated above would affect the small mammal populations, these populations are on the increase and are expected to continue to increase in the ES area.

BIRDS

Waterfowl

Gersing (1975, p. 37) found that (1) duck production increases in pastures under rest rotation grazing and (2) pair populations generally increase in pastures grazed in the spring or early summer or rested the previous year, but such populations decrease in pastures grazed in the late summer or fall of the previous year. The increases are apparently related to the residual nesting cover from the previous year.

Waterfowl production would increase over the short term by an estimated 3 percent (120 nesting pairs) and over the long term by an estimated 4 percent (160 nesting pairs), due to additional reservoirs, which would increase the water surface area, and due to fencing, which would protect the shoreline vegetation for nesting and brooding cover. These figures assume that only one-half of the proposed water developments would be suitable for waterfowl production; they are based on field observations that averaged three nesting pairs per water body in 1976.

Upland Game Birds

Short-term impacts on upland game bird species would be the removal of herbaceous material by livestock and the subsequent decline of insects for young birds, which could result in a decrease of young that survive. However, the mobility of birds and their ability to search farther afield for food would offset any decline in the immediate area of the nest. Increased vegetation would cause some increases in population. Turkeys and chukars are expected to increase in the ES area by 10 to 20 percent, and doves are expected to increase by 15 percent over the long term.

Sage grouse have not been studied sufficiently in the ES area to determine impacts of grazing on the small population that may exist. Limiting factors other than grazing (and therefore beyond the scope of this ES) may be holding the population at its current level. Range improvements, especially water developments, would enhance the sage grouse habitat, but population changes are difficult to estimate.

Chukars would also benefit from range improvements, especially water developments that would open areas of new habitat. Population changes, however, are difficult to estimate.

No impacts have been identified on blue grouse and band-tailed pigeon.

Raptors

Large predatory birds, such as red-tailed hawks, goshawks, and marsh hawks, would be indirectly affected by the grazing management systems. This impact would be primarily through the impacts exerted on prey species mentioned earlier, and is similar to the impacts associated with small mammals, upland game birds, nongame birds, and waterfowl.

Due to the increased population of small mammals and the decreased cover produced by the proposed chainings, the hunting success of aerial predators would be increased. In addition, fence posts and windmills would provide hunting perches for raptors in some short grass and halfshrub areas which might have a shortage of such perches. Fenced catchments and water storage tanks (24 sites in the ES area) would also provide perches for raptors, which could be attracted by a congregation of small mammal prey within the fenced sites.

Other Nongame Birds

The effects of grazing on breeding bird populations are not uniform or easily defined, primarily because grazing varies so much in its local intensity and because the cause-effect relationships in bird populations are difficult to determine (Hurst 1975). Where vegetation composition is changed only slightly, small changes in bird numbers would occur, and where major vegetation composition changes occur, birds (numbers and variety of species) would also change greatly. However, the full range of bird species endemic to a particular rangeland habitat could be ex-

pected to occur when grazing practices aimed at maintaining the range in good condition are applied: ". . . the major human utilization of rangelands (grazing) is not incompatible with proper habitat management for nongame birds, at least if conducted at moderate intensity" (Weins and Dyer 1975). Because of the representative nature of the foregoing statement and because the proposed action has the objective to improve range condition in the ES area, grazing would not have impacts on nongame birds.

Implementation of range improvements and vegetation conversions would cause disturbance of the nests of ground nesting birds, reduction of herbaceous growth resulting in a decrease in insects for young birds, and some possible disturbance of shrub nesting birds in the ES area. It is assumed that even though these impacts are not documented in the ES area they do occur in similar areas which have similar species. The degree of impact is not known, however.

Birds would benefit by the fencing of reservoirs, water catchments, and storage tanks, which would eliminate large herbivore use of the area. Seep areas created by the overflow pipe from each proposed watering trough would also create excellent watering places for small birds, although they could drown in the troughs when attempting to drink in spite of ladders in each trough designed to provide drinking perches.

One-time impacts of all vegetation conversion projects would be destruction or disturbance of nest sites. Chainings conducted under the proposal could decrease the number of breeding species in the immediate vicinity of the vegetation change; however, blocks of sufficient size would be left, and chainings could also increase the number of breeding species due to the edge effect created in a monotypic vegetation type. Current BLM standards for chainings require leaving blocks of unchained pinyon-juniper no smaller than 40 acres. Weins and Dyer (1975) recommended 1 to 2 square kilometers (250 to 500 acres) and no smaller than 5 hectares (12 acres).

In the long term, populations of nongame birds are expected to increase due to the increased vegetation density and vigor and to the improvement of the range due to water developments. It is unknown just how much of an increase would occur.

ENDANGERED SPECIES

The peregrine falcon, being a predatory bird (primary food is passerine bird species), would experience the same impacts as identified in the raptors section.

The black-footed ferret would be affected indirectly through its primary food source, the prairie dog. The prairie dog is a successional species, meaning that it thrives in subclimax successional stages. Overgrazing or continual grazing could cause these subclimax stages to develop, favoring prairie dogs and thereby the black-footed ferret, if it is present. Prairie dogs can maintain these subclimax stages but they do need grazing by large herbivores to initially change the stage (Dasmann 1964). Because of their presence in the ES area, it can be assumed that this overgrazing has occurred at some time in the past.

Grazing by livestock helps maintain prairie dog towns (Koford 1958) as well as produces the conditions necessary for establishment of these towns. This would be caused, in part, by the livestock eating the taller grass and forbs that tend to invade prairie dog town sites. These taller plants act as physical barriers to the movement of prairie dogs. This in turn would cause denudation of the central area as the animals became more concentrated. However, if these taller plants are kept down by livestock, grazing expansion occurs and maintenance of this town is assured.

In conclusion, it is expected that the prairie dog, and hence the black-footed ferret, would maintain their populations in the ES area because under the proposed grazing systems overgrazing should not occur and therefore no new habitat would be created for prairie dogs.

No impacts on river otter or whooping crane have been identified.

SUMMARY

The short-term impacts of spring grazing and (with increased magnitude) summer-fall grazing would be a decrease of browse vigor and reproduction; a reduction of plant growth; increased competition with big game animals during green-up and with small mammals and birds for forage and related insect species; and disruption of life patterns of wildlife. Increased use of browse species in summer and fall would reduce the amount of forage available for winter use by big game and could cause severe mortality among wildlife. Winter grazing would be in direct com-

petition with big game because of the increased livestock use of browse species, particularly on the crucial areas (identified in tables A-11 and A-12 in appendix 5).

Under rest rotation grazing systems, big game forage would be reduced on the grazed pastures. All forage in the rested pastures and all regrowth in early use pastures would be reserved exclusively for wildlife forage and cover. Over the long term, grazing use followed by complete rest for one or two growing seasons, depending on the system, would provide better food and cover for the wildlife present during the years of rest.

There would be gradual increases in quantity and quality of vegetation throughout the unit, depending on specific site potential (see vegetative section). Browse condition in deer crucial areas is expected to go from 5 percent to 7 percent good, from 35 percent to 37 percent fair, and from 60 percent to 56 percent poor. No change in browse condition is expected in elk crucial areas. (See table 3-11.) This improvement would permit general improvement in the health of most wildlife species present due to the increased vigor and quality of increased forage and include some potential for increases in number of animals present.

Under custodial management, big game forage is not expected to increase over the long term as these areas are grazed each year.

Construction of improvements and initiation of vegetation conversion would temporarily affect approximately 29,970 acres of vegetation which serves as wildlife forage and habitat. All mobile animals would be displaced temporarily, while immobile animals, small mammal and snake dens, and ground nests in the disturbed area would be destroyed.

The overall long-term effect of construction and maintenance of proposed range improvements would be the loss of approximately 25 acres of vegetation, an insignificant amount of habitat when compared with the total amount of available habitat.

Over the long term as a result of the proposed action, deer are expected to increase by 2,200 to 4,500 wintering animals; elk to increase by 96 to 156 wintering animals; and antelope to increase by 53 to 73 animals. Population increases for other species are expected to occur but are difficult to quantify.

Aquatic and Riparian

RIPARIAN HABITATS

Site specific grazing systems designed to improve the condition of range plants are not tailored to the physiological requirements of woody riparian plants. The success of a rest rotation system in improving range vegetation does not guarantee that riparian plants bordering a stream within pastures of the system would be maintained. Results of rest rotation on riparian vegetation range widely from positive to negative. Each case is unique and must be evaluated separately. The following discussion documents the "worst case" that could be expected.

Grazing riparian plants at the wrong times and heavily utilizing riparian plants can cause the riparian area to decline and not recover. In woody plants, food reserves and growing points which are located on stems and twigs are exposed and available to grazers. Grazing these plants in fall and winter after their food reserves are stored and during their dormant period can limit the ability of the plant to regrow the following spring. Removal of more than 60 percent of crown can significantly reduce the regrowth potential of some species (Hormay 1970).

According to Hormay (1970), "The growth of herbaceous plants is not affected significantly by grazing after reserves are stored. The reserves and growing points on the plants are out of reach of animals. In woody plants, however, reserves and growing points are exposed, and grazing after reserves are stored and during the dormant period can harm these plants. Removal of growing points does the most damage."

Two studies conducted by Platts and Rountree (1972) and Eckert (1975) question whether riparian vegetation can be restored on previously overgrazed pastures through the use of rest rotation grazing management systems. These authors concluded that riparian vegetation receiving one year of rest in a rest rotation system did not recover adequately. Thus, according to their findings, in some cases pastures may recover during a year-long rest, but stream banks do not.

This type of grazing prevents the natural replacement of old cottonwoods by younger trees in riparian zones. Such use may be detrimental to wildlife, aesthetic or recreational, or other values. About the only way to preserve such values is to fence off the area from grazing. Reducing

livestock or adjusting the grazing season will not solve such a problem (Hormay 1976).

Analysis of Impacts on Riparian Habitats

Table 3-14 shows the predicted future condition of riparian habitats by allotment and stream 28 years after full implementation of the proposed action (2006). Comparing present conditions of riparian habitats with the future conditions under the proposed action reveals a net improvement. The future condition of the riparian habitat after implementation of all AMPs (28 years from the present) would be 130.9 miles of stream riparian habitat unchanged, 2.1 miles improving from nonexistent to good, 17.6 miles improving from poor to fair, 2.6 miles improving from poor to good, 1.2 miles improving from fair to good, 5.4 miles improving from good to excellent, and 3.0 miles declining from good to poor. This shows a net overall improvement of 28.9 miles of stream riparian habitat with implementation of the proposed action over the present situation.

This 28.9 miles of net improvement will result from a better distribution of grazing pressure, establishment of new water sources away from stream bottoms, and from a better control of grazing and trailing in specific stream bottoms. Rest rotation systems alone are not expected to restore or improve riparian habitats, but in only one case is a continued decline expected to occur. In most cases the maintenance of the present condition is expected. The 13.5 miles of stream riparian habitat in poor condition and the 77.2 miles in fair condition will continue to be partially limited due to grazing pressure with the proposed action.

AQUATIC HABITATS

Previous research studies have established the relationships among stream bank grazing or trampling, sediment yield, turbidity, increased water temperature, and the ecology of a stream. A brief review is given here to establish these relationships before site-specific impacts of the proposed action are analyzed. Of course, turbidity, sediment yield, and some stream bank instability can occur in the absence of livestock grazing due to natural phenomena such as cloudbursts, etc. Wildlife also graze riparian vegetation.

Stream Bank Grazing and Trampling

Boussu (1959) and Platts and Rountree (1972) consider the most beneficial characteristics of stream-side vegetation to be the cover it furnishes to aquatic organisms. Stabilized banks provide hiding places for fish, as do overhanging shrubs. White (1973) proved that increased abundances of trout were achieved in Wisconsin creeks by protecting stream bank vegetation. This protection restored channels from agricultural effects, primarily grazing and trampling by livestock. Platts (1972) also determined that a loss of bank cover was detrimental to fish populations.

Similarly Phillips (1931) found that stream reaches covered with brush supported more stream bottom organisms than did cleared areas of the stream. Terrestrial insects living in stream bank vegetation furnish a significant part of the diet of stream fish.

In addition riparian vegetation greatly reduces stream bank erosion by slowing current velocities, mechanically holding soil particles, and maintaining moist conditions in the soil itself. Reduced erosion reduces stream siltation. In addition, the vegetative buffer strip traps many fine particles being carried toward the stream via sheet erosion.

Sediment Yield and Turbidity

Particles of sediment settling into the stream bed fill the interstices of the bed and reduce the natural habitat of invertebrates. Cordone and Kelly (1961) concluded from an extensive literature review that silt can and often has destroyed insect populations. Thus, the ability of a stream to produce aquatic insects benefical to fish populations as food is closely related to the amount of sediments in the stream bottom.

Gravel areas of the stream bed, which are the principal spawning beds for trout, also become filled with sediments, and spawning and egg incubation are impaired. The findings of many studies indicate conclusively that sedimentation seriously reduces the survival of trout embryos and fry (Peters 1965; Cooper 1956). The upper reaches of small streams, such as Spring, Terror, and Hubbard, and river habitats in the North Fork and the Gunnison are typical of areas where this occurs. Turbidity is also harmful to most aquatic invertebrates. Turbidity reduces the amount of light penetrating the water; this reduction decreases the photosynthetic capacity of benthic algae, which in turn limits stream productivity by removing the first link of the algae-invertebrate-fish food chain. Some of the solid particles become attached to the mucous membranes of invertebrates and cause their suffocation. Gamon (1940) found a 40

TABLE 3-14
RIPARIAN HABITAT: PREDICTED FUTURE CONDITION UNDER PROPOSED ACTION (BY STREAM AND ALLOTMENT)

Stream Name	Allotment No. & Name	NRL Miles	Present Condition a/	Predicted Condition in 2006 a/
Cottonwood (Escalante)	4007 Sawmill Mesa	2.2	Poor	Fair
	4008 25 Mesa	12.4	Poor	Fair
Little Dominguez	4001 Dominguez	13.0	Fair	Fair
East Fork Escalante	4026 Escalante Canyon	4.6	Fair	Fair
Escalante	4001 Dominguez	12.0	Fair	Fair
Gunnison (Black Canyon to Uncompahgre confluence)	*	15.0	Good	Good
Gunnison (Uncompahgre confluence to area border)	*	10.0	Fair	Fair
Monitor	4010 Monitor Mesa	3.8	Poor	Poor
	4014 Joker	3.0	Poor	Fair
Potter	4010 Monitor Mesa	6.8	Nonexistent	Nonexistent
Roubideau				
Lower	4011 Lower Roubideau Canyon	2.1	Nonexistent	Good
Upper	4010 Monitor Mesa	4.9	Poor	Poor
	4012 Canal	2.6	Poor	Good
Beaton	5540 Dry Gulch	3.0	Nonexistent	Nonexistent
Billy	5530 Billy Creek	0	Excellent	Excellent
Chaffee	5530 Billy Creek	1.6	Nonexistent	Nonexistent
Cow	5566 Cow Creek	0.6	Good	Good
Dallas	None	0.8	Good	Good
Dolores	5520 Lower Horsefly	3.4	Excellent	Excellent
	5522 Beaver Hill	1.2	Excellent	Excellent
Dry	5507 Pipeline	3.4	Good	Good
	5513 Dry Creek Basin	5.6	Good	Good
	5516 Piney	3.0	Good	Poor
Dry Cedar	5520 Lower Horsefly	2.1	Fair	Fair
Cedar	5569 Hairpin	2.2	Fair	Fair
McKenzie	5529 Log Hill	1.2	Fair	Good
Happy Canyon	5522 Beaver Hill	4.6	Excellent	Excellent
Spring	5522 Beaver Hill	5.4	Good	Excellent
Uncompahgre	*	1.8	Poor	Poor
Smith Fork	5022 Rabbit Gulch	2.4	Good	Good
Bear	4517 Coal Gulch	3.0	Fair	Fair

a/ Condition class criteria for riparian habitats are given in footnote b/, table 2-27.
* Major rivers may cross many allotments. The effects of specific allotments on major rivers are insignificant when compared with the effects of the overall watershed.

TABLE 3-14
RIPARIAN HABITAT: PREDICTED FUTURE CONDITION UNDER PROPOSED ACTION (BY STREAM AND ALLOTMENT) (Cont.)

Stream Name	Allotment No. & Name	NRL Miles	Present Condition a/	Predicted Condition in 2006 a/
Cottonwood (North Fork)	4517 Coal Gulch	1.2	Excellent	Excellent
Deep	4525 Anthracite Creek	0.6	Fair	Fair
North Fork Gunnison	4517 Coal Gulch	4.2	Fair	Fair
Hubbard	4516 North Fork	1.4	Fair	Fair
Leroux	4503 Stingley Gulch	0.5	Excellent	Excellent
	4504 Leroux Creek	1.0	Excellent	Excellent
Minnesota	4528 Oak Ridge	0.5	Excellent	Excellent
Muddy	4520 Spring Creek	2.6	Fair	Fair
West Muddy	4519 Muddy Creek	0.8	Fair	Fair
Terror	4513 Stevens Gulch	3.0	Good	Good
Williams	4525 Anthracite Creek	0.8	Good	Good
Roatcap	4507 Jay Creek	1.6	Good	Good
	4511 Overland	0.4	Good	Good
	4513 Stevens Gulch	1.2	Good	Good
Currant	4502 Surface to Leroux	2.2	Good	Good
Anthracite	4548 Creek Bottom	0.3	Fair	Fair
Oak	4025 Ward Creek-Doughspoon	2.8	Fair	Fair
SUMMARY OF NRL MILES			12.4 Excellent	17.8 Excellent
			45.4 Good	42.9 Good
			60.8 Fair	77.2 Fair
			30.7 Poor	13.5 Poor
			13.5 Non-existent	11.4 Non-existent
			162.8 Total	162.8 Total

percent decrease of invertebrates with 80 parts per million (ppm) inert solids in a stream.

Sediment in water also removes the protective mucous covering of fish and increases their susceptibility to parasites and disease. The gill filaments of fish become coated with sediment particles and respiration efficiency is decreased. In a study by Herbert et al., fish were exposed to test concentrations of suspended solids of 810 ppm, 270 ppm, and 90 ppm for six months, and their survival was decreased. Furthermore, game fish are sight feeders, and fish feeding is decreased by turbidity. Bachman (1958) found that cutthroat trout cease to feed when exposed to 35 ppm silt.

In conclusion, turbid streams generally have a lower abundance and diversity of aquatic species.

Increased Water Temperature

Riparian plants buffer water temperature and light penetration. During the summer, leaves of stream-side plants shade the light to winter levels. Reducing the light level reduces summer water temperatures, allowing cold-water organisms from higher elevations to spread down into lower riparian niches. Moreover, trout habitat is dependent on water temperatures remaining below 65 degrees. This is most critical in smaller streams, such as Spring Creek, Smith Fork, and Upper Dry Creek. Many studies have shown that extensive removal of riparian cover can seriously increase water temperature (Tebo 1974).

Analysis of Impacts on Aquatic Habitats

Aquatic habitats of streams in the ES area are affected by a variety of land uses throughout their watersheds. Impacts of the proposed action on aquatic habitat result principally from the concentration of livestock use on stream bottom riparian vegetation and from the influence of livestock use on the sediment yield from watersheds. Turbidity and sediment yield to a stream in the watershed depend on soil and hydrologic factors which are modified by the watershed use.

Several factors were considered together to determine the final impact of the proposal on the aquatic habitat of each stream. Direct impacts on riparian vegetation, as identified in table 3–14, were assessed, by using stream surveys and by analyzing proposed AMP pasture boundaries and grazing systems. The impacts on riparian vegetation directly affect the condition of aquatic habitats. In addition, stream watershed information given in table 2–28 was used in the analysis of aquatic habitats. The acreage of the watershed, the NRL acreage, the percentage of the watershed composed of NRL, the total and average per acre sediment yield for NRL in the watershed, and the sediment yield by allotment from improvements were considered in this stream by stream analysis. All allotments which are either totally or partially located within the watershed of the streams discussed below are given in table 3–14.

Impacts on Aquatic Habitats of Specific Streams

COTTONWOOD. Sediment yield in the drainage is moderate to high. The riparian vegetation is expected to improve because the use of Cottonwood Canyon is restricted to trailing. This improvement combined with a slight reduction of erosion on 59 percent of the watershed would allow the aquatic habitat to improve. Better survival of aquatic organisms in the stream and slightly better survival in the Uncompahgre River is expected.

ESCALANTE AND LITTLE DOMINGUEZ. (The watershed is 31 percent NRL.) Sediment yield at the present greatly affects the aquatic habitat. The habitat is overburdened with silt because 50 percent of the watershed is in poor condition and has been overgrazed in the past.

The rest rotation system proposed for 4001 Dominguez would improve the watershed and slightly decrease the presently high sediment yield. Trailing on the Gunnison Trail and in Escalante Canyon, however, would increase erosion in those areas. In the long term, the proposed action would have a small positive effect by decreasing sediments and turbidity in the streams. Increased survival and increased population of invertebrates and nongame fish would result in these streams and in the Gunnison River. There is no fishery on NRL in Escalante Canyon.

MONITOR. (The watershed is 36 percent NRL.) Monitor Creek follows the western boundary of 4010 Monitor Mesa. The pasture layout of this allotment allows grazing in the Monitor Creek bottom; water is scarce on the allotment, and the creek bottom has been heavily used. As a result, the riparian vegetation is in poor condition. With the proposed action, new water sources, pastures, and check fences should reduce cattle use in the creek bottom. This stream could then support a better riparian community. A short-term and

minimal increase in suspended sediment and turbidity would occur from range improvements. The creek section on 4014 Joker is inaccessible to livestock and should remain in good condition.

The NRL portion of the watershed has a moderate sediment yield, and the proposal would not affect erosion enough to influence this watershed. Therefore, the good rating for the aquatic habitat of Monitor on 4010 and 4014 would be retained. Overall an increase in riparian vegetation and a small decrease in stream sediments in Monitor Creek would have a positive impact on numbers of stream fish and invertebrates as well as increase the value of the area to larger animals utilizing the riparian zone.

POTTER. (The watershed is 40 percent NRL.) The proposed action would decrease the moderate to high sediment yield from the watershed. No change in the aquatic or riparian habitats is expected due to lack of water in this intermittent stream watershed.

ROUBIDEAU. (The watershed is 29 percent NRL.) Monitor and Potter creeks drain into Roubideau. The sediment yield in this creek is moderate to high.

Roubideau Creek crosses three allotments. 4012 Canal allotment encompasses the upper section of the creek. In pasture four, the main suitable grazing area is Roubideau Creek bottom. Riparian vegetation is rated poor in this area because cattle presently congregate in the canyon and serious overgrazing results. The proposed action would remove the stream bottom from use, except for annual trailing, by fencing the canyon at the point where the stock trail drops into the canyon from the east. Riparian habitat would improve greatly as a result. Moreover, water projects would induce better cattle distribution on the allotment, providing better watershed conditions. Small improvements in the watershed condition of NRL would decrease sediment yield to the aquatic habitat, which would improve from fair to good.

The middle section of the creek is on 4010 Monitor Mesa allotment. The riparian vegetation is rated poor, and the stream carries sediment loads. A temporary short-term increase in sediments would result from improvements, but the aquatic habitat of this section would not change because of cattle trailing, grazing, and lack of water in this part of the canyon.

Allotment 4011 Lower Roubideau Canyon has been proposed for limited cattle trailing use, totaling 27 AUMs for both spring and fall. In the past, extremely heavy trailing use has depleted the vegetation in the canyon. Therefore, the riparian habitat would recover slowly because the area is in poor condition. However, as riparian and other canyon vegetation return the highly erosive condition of the canyon should improve. The aquatic habitat would also improve as the riparian condition improves, although aquatic habitat would continue to be limited by erratic flow and sediment. Overall, an increase in aquatic invertebrates, warm water fishes, and riparian species of wildlife should result in Roubideau Creek.

BEATON. Intermittent streams such as Beaton do not support wildlife within their length. However, they have an impact on perennial water courses lower in the drainage because they influence water quality and thus aquatic habitat. Sediment yield from this watershed is high, and runoff high in suspended sediments and turbidity influences the Uncompahgre River. Slight improvement of the quality of runoff is expected. The impact of this improvement is described under the Uncompahgre River.

BILLY CREEK. (The watershed is 34 percent NRL.) Billy Creek flows between pastures on allotment 5530 Billy Creek. The stream and riparian habitat are owned by the Colorado Division of Wildlife (DOW) and are removed from grazing by fences. The proposed rest rotation system and improvements on approximately one-third of the watershed would slightly decrease the moderate sediment yield to aquatic systems. Slight improvement in the aquatic invertebrate numbers and fish would occur in the streams. Effects on the Uncompahgre River are discussed under that heading.

CHAFFEE. (The watershed is 54 percent NRL.) This intermittent stream affects the Uncompahgre River. Moderate sediment yields from the NRL portion of the watershed may decrease slightly.

COW AND DALLAS. (NRL make up an insignificant part of these watersheds.) Three allotments in this area—5555 Taylor Draw, 5556 Burro Creek, and 5557 Alkali—would have grazing eliminated under the proposal because of the USBR Dallas Creek project. This action would not change the aquatic habitat of these streams on the Uncompahgre River.

McKENZIE. A slight decrease in sediment yield would have a positive effect on the Uncom-

pahgre River. The riparian habitat should improve with improved livestock distribution, but aquatic habitat would remain nonexistent.

UNCOMPAHGRE RIVER. Fewer than two miles of the Uncompahgre River are on NRL, but from Ridgway to Montrose the river passes adjacent to large tracts of NRL. Billy, Beaton, Cow, Dallas, Chaffee Gulch, and McKenzie creeks influence this section of the river. The use of NRL allotments particularly influences the turbidity and sedimentation of the river in this area. Presently the fish population of the river is dominated by rough fish, and aquatic invertebrate numbers are depressed, partially due to the high sediment load. The proposal would slightly decrease sediments coming from the six watersheds mentioned. The impact would be an improved survival of aquatic invertebrates and an environment more suitable to survival of hatchery trout and to the production of wild trout.

DOLORES AND HAPPY CANYON. (NRL make up 28 and 27 percent of these watersheds.) The riparian vegetation is excellent and stable, probably because the canyon bottoms are inaccessible. There would be a short-term increase in sediment yield from range improvements, but improved distribution of cattle with new water sources and pasture boundaries along with improved watershed conditions should decrease long-term sediment slightly. These intermittent streams do not support aquatic habitat. The overall impact would be a minor improvement in the Uncompahgre River with an improved potential to support clean water organisms.

DRY. (The watershed is 42 percent NRL.) A short-term adverse impact on Dry Creek would result from sediment yield from range improvement in allotment 5507 Pipeline. An unquantifiable number of aquatic invertebrates and fish would be smothered by sediments.

Grazing in pasture three of 5516 Piney would continue to cause damage to the riparian and aquatic habitat. The upper forks of Dry Creek support trout but the habitat is going to continue to decline with the AMP.

Some watershed improvement is expected in the middle and lower section of Dry Creek on 5513 Dry Creek Basin, especially from seeding projects. Riparian vegetation would decline to fair.

Overall, slight improvements in sediment yield are expected. The net impact on the aquatic habitat would be a decline from good to fair condition mainly due to riparian damage.

DRY CEDAR AND CEDAR. (The watersheds are 21 percent and 11 percent NRL.) These drainages have high sediment yields and fair riparian communities. Slight improvement may occur within the watersheds' NRL acreages. Improvement in water quality due to sediment decrease would favor the survival of larger numbers and variety of aquatic organisms in these streams and the Uncompahgre River.

SPRING. (The watershed is 36 percent NRL.) Spring Creek Canyon would be removed from grazing except for cattle trailing two days each way. Riparian habitat would return to excellent condition, and aquatic habitat should improve to excellent also. The rest rotation system would maintain the moderate sediment yield on these allotments, although a chaining in the canyon and other range improvements may cause a partial temporary loss of aquatic invertebrates and decrease in fish reproduction. Trout habitat would extend lower down onto NRL with improved habitat and lowered water temperature due to increased riparian cover. Stream productivity should increase over the long term.

SMITH FORK. (NRL make up a small and insignificant part of this watershed.) The riparian and aquatic habitats are good, and no change is expected.

BEAR AND COTTONWOOD. (These small watersheds are 23 percent and 44 percent NRL.) Sediment yield is low to moderate, and the proposed action would improve or maintain this condition. No change is expected in the riparian vegetation, and these small aquatic habitats should remain in their present condition.

DEEP AND WILLIAMS. (NRL in these watersheds are very limited.) Rest rotation systems should maintain riparian vegetation in the present condition. Deep Creek would remain in fair condition, while Williams Creek would remain in good condition. Sediment yield in the watershed would remain low.

LEROUX AND HUBBARD. (These large watersheds are only 12 percent and 5 percent NRL.) Direct grazing damage to riparian vegetation is not evident, and very little change is expected.

MINNESOTA CREEK. (The watershed is 22 percent NRL.) Improvement of the Minnesota Creek watershed would decrease the sediments

carried to the North Fork and improve the aquatic habitat of the creek. Interseeding and pinyon-juniper chaining would have short-term negative impacts, but the long-term effect of watershed improvement would be good. Improvement of the distribution of grazing cattle via fences, trails, and water developments would improve the watershed as a whole. There is no problem from grazing on riparian vegetation on NRL in the Minnesota Creek watershed.

Overall, there would be a decrease in aquatic production of fish food organisms and a decrease in fish survival for one to four years after implementation of the AMP. This initial decrease would be followed by a return to present conditions and then by an increase in fish food organisms and an increase in fishery potential for Minnesota Creek after four years.

MUDDY CREEK, EAST AND WEST FORKS. Four small allotments make up a minor percentage of the drainage: 4519 Muddy Creek, 4520 Spring Creek, 4521 Stock Driveway, and 4522 Downing. One source of erosion on NRL is the stock driveway passing through allotments 4521 and 4522; this erosion would continue. The stream is in very poor condition due to heavy sediments. Because NRL are limited, there is little opportunity for BLM action to influence the watershed; therefore this environment would remain in a degraded condition. Aquatic productivity of invertebrates and fish would remain very poor, and no fishery would develop.

TERROR. (The watershed is 11 percent NRL.) Much of this stream is inaccessible due to steep canyons. However, there is one area of critical erosion that adds sediments to the creek; this area should improve with implementation of the AMP. Range improvements would also be beneficial to the watershed. Riparian vegetation is excellent and should remain so. The potential of Terror Creek to support aquatic insects and trout may improve slightly; the fishery would remain good.

ANTHRACITE CREEK. Allotment 4548 Creek Bottom is transected by Anthracite Creek. Cattle use of riparian vegetation is heavy, and the riparian vegetation would remain in only fair condition with the proposed custodial management of 4548. There is an insignificant effect on this large stream from NRL.

ROATCAP. (This watershed is 40 percent NRL.) Some riparian cover has been removed from along the stream, but it remains in good condition. It should improve slightly with better distribution of cattle on the pastures, and the good rating should be retained. The east fork does not support aquatic habitat because it is intermittent. The west fork would be maintained as good habitat with native trout.

CURRANT. (The watershed is 28 percent NRL.) The stream habitat suffers due to dewatering for irrigation purposes. The AMP would improve the part of the watershed managed by BLM, and runoff water quality should show slight improvement. The aquatic habitat would potentially support trout, but the loss of water in late summer prevents this.

NORTH FORK. The following streams contribute water to the North Fork of the Gunnison: Bear, Cottonwood, Deep, Williams, Leroux, Hubbard, Minnesota, Muddy, Terror, Anthracite, Roatcap, and Currant. NRL make up a large part of the watershed of this river, and water quality of this river is influenced by the use of BLM allotments. With the proposed action, some minor decrease in turbidity and sediments reaching the North Fork would result. This would somewhat improve the numbers and diversity of invertebrates, increase available food for fish, increase the condition and numbers of trout surviving, and increase the possibility of trout reproduction. The water quality of the North Fork is influenced by many activities in the valley, and the impact directly attributable to BLM grazing programs is impossible to quantify with present data and methods.

OAK. Intermittent flow prevents aquatic organisms from surviving, and riparian plants here are limited to drought and alkali resistant species. No change is expected in the stream area.

SUMMARY

Pasture design, cattle use of riparian vegetation, sediment and turbidity from watersheds used for grazing, sediment yield from range improvements, and the percentage of a watershed made up of NRL each partially determines the impacts of the proposed action on aquatic and riparian organisms.

Grazing would remove stream bank vegetation, and one year of rest may not be sufficient for riparian vegetation to recover. A net overall improvement is expected for 28.9 miles of riparian habitat (see table 3-14).

Streams on the Uncompahgre Plateau, including Cottonwood, Escalante, Little Dominguez, Monitor, Potter, Roubideau, and Spring creeks, would benefit from the proposed action. Decreased grazing pressure from limitation of grazing in canyon bottoms and reduced trailing would benefit riparian vegetation and decrease erosion induced by trampling. Slight decreases in sediment yield and turbidity in streams from improved watershed conditions on the plateau would increase the abundance and diversity of aquatic invertebrates and improve numbers of trout in some headwaters and warm water fish in the lower reaches of these streams. Dry Creek would decline due to riparian damage from grazing.

Intermittent streams draining into the Uncompahgre River above Montrose, including Chaffee, McKenzie, and Beaton creeks, do not have aquatic habitat. Billy Creek also drains to the Uncompahgre, and this aquatic habitat would remain good. Also in this drainage, Cow and Dallas creeks would not change because the USBR Dallas Creek project requires removal of grazing on adjacent allotments. The Uncompahgre River would become slightly more suitable for trout. Improved water quality of runoff from Dolores, Happy Canyon, Dry Cedar, and Cedar creeks would have a slight positive effect on the lower Uncompahgre River. Habitat in these streams would remain limited.

Most streams in the North Fork area would improve slightly. Improved distribution of grazing pressure would protect riparian zones, and watershed improvements would decrease or maintain present sediment yields. Slight increases in production of aquatic invertebrates are expected along with an increased survival and production of trout. This would include Deep, Williams, Leroux, Hubbard, Minnesota, Terror, Anthracite, Roatcap, and Upper Currant creeks. Water quality of the North Fork River is influenced by use of BLM allotments throughout the watershed. The trend would be gradual improvement leading to some small and unquantifiable increase in numbers and diversity of aquatic insects, and increase in food available to fish, and an increase in the condition and survival and possibly reproduction of trout in the river. Large impacts on water quality from other uses in the valley would continue to make assessment of BLM impacts on the river difficult.

Cultural Resources

The impacts on archeological resources are analyzed first, followed by a summary of impacts on historical resources.

Archeological Resources

The proposed action could result in a number of adverse impacts to archeological resource sites for a variety of reasons. There are 304 recorded archeological sites within the area, and it is expected that most could be affected in one way or another. Impacts to specific sites by specific allotment cannot be identified due to the lack of Class III inventory (100 percent inventory) and to nonspecific locations of allotment improvements. However, the following allotment-specific actions that could affect archeological resources can be identified:

1. Vandalism.
2. Livestock trampling.
3. Livestock rubbing.
4. Spring development and/or improvement.
5. Pipeline, water trough, wells, and water storage projects.
6. Water catchments and reservoirs.
7. Trail construction.
8. Cattleguards.
9. Fences.
10. Chainings.
11. Seeding.
12. Contour furrowing.

Although vandalism cannot be directly related to the proposed action, increases in this activity can be considered an indirect impact. Unrestricted access via the existing road network and proposed construction activities for a short period of time open much of NRL to the threat posed by vandalism. Range users, construction crews, and the general public as users of NRL—not to mention amateur archeologists and relic hunters—tend to appropriate visible remains illegally from archeological and historic sites. The proposal would indirectly increase vandalism through the spread of local knowledge about site location.

Vandalism is the single most damaging impact on archeological and historical sites. Unscientific collection and excavation of cultural sites is perhaps the single greatest obstruction to understanding past use of the area. The destruction of archeological and historical sites through vandalism generally means the total loss of information that might have been recoverable through scien-

tific research or in advance of construction activity that would destroy a cultural resource.

The cultural resource base is finite, and the continued loss of information skews the results of studies of past cultures. Because vandals usually concentrate their efforts on the more obvious and more spectacular sites or objects, the resulting loss of information may critically deter understanding of past cultural phenomona.

The major types of losses that result from vandalism are the loss or mixing of diagnostic characteristics that aid in identification of a cultural unit or temporal placement, the loss or mixing of data concerning the adaptations of past peoples to their environment, and the loss of data concerning the effect of past peoples on the environment.

The effect of grazing, in particular trampling, on archeological sites is not fully understood. Buckles (1971, p. 1048) noted an adverse impact on sites in the ES area coinciding with cultivation practices. In that case, cultivation was probably the main factor disrupting intrasite patterning. Litzinger (1975), in a study of the effects of sheep grazing on southwestern Colorado environments, found overgrazing to be detrimental to archeological sites: secondary geologic processes, such as erosion, contributed to destruction of sites.

Due to the lack of definitive information concerning impacts of grazing, the Montrose District archeologist visited approximately 50 previously recorded sites in the ES area. Comparisons were made between the current (as found) condition and the original site descriptions, maps, and photographs.

The evidence indicates, in general, that livestock grazing has only minimal effects on archeological sites, except for specific situations. These situations are trampling around springs where severe mixing of horizontal layers can occur and along stock trails where secondary erosional processes occur; the result would be displacement of cultural materials. In general, livestock grazing does not cause significant adverse impacts to archeological sites except where soil stability is poor and secondary geologic processes can take place as a result of overgrazing, stock trailing, etc.

One other potential impact of grazing has been identified through on-site examination. Standing structures, such as wickiups and historic buildings, could be adversely affected by having their integrity disrupted (e.g., a structure knocked down). The detrimental effect of livestock rubbing on standing structures has been documented elsewhere, specifically in the San Luis Grazing ES.

Several wickiup sites and historic structure sites are known in the ES area. At present these sites have not been affected because there has been no grazing in the vicinity of the sites. With the implementation of the proposed range programs, however, the possibility would increase severalfold that these very fragile resources might suffer adverse impacts, primarily in the form of increased cattle rubbing.

All of the other implementing actions could potentially produce negative effects because they generate primary surface disturbance. That surface disturbance in the vicinity of cultural resources creates adverse effects has been demonstrated and documented by a variety of sources, such as De Bloois, Green, and Wylie (1974). The impacts of surface disturbance on archeological sites are generally:

1. Disturbance or loss of horizontal cultural deposits.
2. Disturbance or loss of vertical cultural deposits.
3. Disturbance or loss of paleoecological data.
4. Disturbance or loss of natural sedimentary deposition. Surface disturbance, in effect, causes destruction or mixing of artifacts, destroying the evidence of human use and patterns of occupation at a site.

All of the identified impacts could potentially adversely affect open lithic sites. Rock art panels are not likely to suffer impacts unless construction activities require movement of the rock containing the panel. Surface structures, standing wickiups, and standing historic sites could suffer impacts by cattle rubbing and by construction activities if workers pass through or are immediately adjacent to the structure. Rockshelters are unlikely to be affected by the proposed action. Trampling is the only conceivable source of impact, and based on topographic situation of the known rockshelters adverse impact is unlikely.

Historical Resources

Most of the historical resources that were surveyed are on private or state land and are protected by fencing or lack of legal access. Such sites may not be affected by the proposed action. Most of the few sites located on NRL are ruins and would not be affected by the proposed action.

Summary

Implementation of the proposed action could result in the disturbance or destruction of various cultural resource sites. Direct impacts on archeological sites would be primarily the result of the proposed range improvements. Grazing itself, specifically trampling, is considered to have a minimal impact, except in areas around springs, in areas susceptible to secondary geologic processes, such as erosion, or around surface sites and standing structures. Increased cattle rubbing could damage standing sites, such as standing wickiups, and in particular three historic sites, 011 cabin, GG-011 cabin, and GG-007 lime kiln.

Visual Resources

Table 3-15, Visual Impacts Summary, displays the results of contrast ratings (visual impact determination process; see appendix 8). As indicated in appendix 8, this table summarizes the results of a generalized or nonsite-specific analytical exercise. A close look at this table shows that very few of the proposed facilities would create visual impacts in VRM Class III and IV areas, while a look at the VRM classes, map 2-12, shows that most of the public lands are covered by Classes III and IV. A site-by-site analysis has resulted in the determination that there would be no discordant visual impacts from any of the projects.

Recreation

This section discusses impacts of the proposed action on hunting, fishing, and areas managed for recreational values. The most significant impacts would be on hunting and fishing opportunities.

Hunting

The proposed action would provide some additional forage and cover for an additional 15 to 30 percent of wintering deer and 8 to 13 percent of wintering elk (see Wildlife). Assuming that a percentage of the increase in animal populations would result in an increase of harvestable animals, it follows that more hunter-days could result. Quantification of additional hunter-days is uncertain at this point, however, since DOW management strategies will vary (e.g., DOW may not choose to allow additional harvest in areas covered by the proposed action). Moreover, the increased demand will far exceed any opportunities for increase in hunter-days resulting from the proposed action, that is, increased hunter-days will result in spite of the proposed action, since demand already exceeds supply. However, the increased populations resulting from the proposed action may help to meet the increased demand.

A report prepared by the DOW in 1974 indicates that demand already exceeds supply of hunting opportunities for antelope (magnitudes can be obtained from this report). Hunting, which is by permit only, harvests about 20 percent of pre-season population. Reduced levels of harvest are planned until optimum population numbers are achieved. The proposed action appears to coincide with state policy and would allow additional hunters and nonconsumptive users the opportunity to satisfy demands.

Demands for deer hunting opportunities are expected to exceed supply before 1980. Thus, future hunting restrictions and limitations seem likely. Stated goals and policies include expanding existing populations, providing a wider array of hunting opportunities, and improving habitat, which includes eliminating conflict with other game species such as elk.

Elk hunting demand is also expected to exceed supply before 1980. The report indicates that current levels of hunting demand cannot be maintained without reducing success levels. Some combination of permits and general license hunting may be instituted with management strategies focusing on maximizing habitat and controlling factors that would limit the size of elk herds.

Fishing

The quality of fishing may be improved by implementation of the proposed action. Cattle would still use the streams as a source of water, regardless of desired grazing management objectives; however, in theory they would use the streams less. If so, the fishing resources in the area would suffer fewer adverse impacts from livestock trampling and vegetation depletion than at present. Although the fishing conditions may be more pleasant, it is doubtful that fishing use would increase as a result of the proposed action.

Areas Managed for Recreational Values

GUNNISON GORGE RECREATION LANDS

There would be no undesirable impacts on the Gunnison Gorge Recreation Lands. Since grazing is an acceptable use within the recreation lands, any action attempting to better manage and control livestock operations can only serve to im-

TABLE 3-15
VISUAL IMPACT SUMMARY

Project	Class I	Class II			Class III			Class IV		
		Fg	Mg	Bg	Fg	Mg	Bg	Fg	Mg	Bg
Fences	X	X	0	0	0	0	0	0	0	0
Stock Trails	X	X	X	X	X	0	0	0	0	0
Stock Bridges	X	X	0	0	0	0	0	0	0	0
Cattleguards	X	X	X	X	X	X	0	0	0	0
Pipelines	X	0	0	0	0	0	0	0	0	0
Wells	X	X	0	0	0	0	0	0	0	0
Tanks	X	X	0	0	0	0	0	0	0	0
Catchments	X	X	X	0	X	0	0	X	0	0
Reservoirs	X	X	X	0	0	0	0	0	0	0
Horizontal Wells, Springs, and Troughs	X	X	0	0	0	0	0	0	0	0
Chainings and Reseedings	X	X	X	0	X	0	0	0	0	0
Interseedings	X	0	0	0	0	0	0	0	0	0
Contour Furrows	X	X	0	0	0	0	0	0	0	0

Note: Fg = foreground; Mg = middleground; Bg = background. 0 = harmonious impact; X = discordant impact. Therefore, according to the table, any project would create a discordant impact (X) in a Class I area; a stock trail would create a discordant impact (X) in a Class III area when it could be seen from the foreground, but it would create a harmonious impact (0) when it could be seen only from the middleground or background; etc.

prove recreation and livestock compatibility. A large part of the recreation lands are unsuitable for grazing because of physiographic limitations.

GUNNISON RIVER WILD AND SCENIC RIVER STUDY AREA

Implementation of the proposed action would not affect the corridor of the Gunnison River being studied for inclusion in the National Wild and Scenic Rivers system. Range improvements and range utilization would not occur within the study corridor because of physiographic constraints.

NEEDLE ROCK NATURAL AREA

The Needle Rock Natural Area would not be adversely affected because grazing is an acceptable use in the area and no range improvements are planned.

DOMINGUEZ CREEKS AREA

Dominguez Creeks area has been identified for study of primitive values. The management framework plan stated that the area will be managed for its primitive values until such time as a study is completed to determine the feasibility of a primitive designation. As of this date (December 1976) a study has not been completed.

In accordance with PL 94-579 (Sec. 603 of the Federal Land Policy and Management Act of 1976), BLM is required to review those roadless areas of five thousand acres or more and roadless islands of the public lands, identified during the inventory required by section 201 (a) of this act as having wilderness characteristics described in the Wilderness Act of September 3, 1964 (78 Stat. 890; 16 VSC 1131 et seq.). BLM is also required to recommend to the President from time to time the suitability or nonsuitability of each such area or island for preservation as wilderness. The Dominguez Creeks area is currently scheduled for a review in fiscal year 1980 (FY 80).

The proposed action would have impacts on the management of the Dominguez Creeks area. In accordance with primitive area guidance documents and the Wilderness Act of 1964, grazing is an allowable activity within designated areas. However, some elements of the proposed action would not be consistent with primitive area management policy (as set forth in the excerpt from the Colorado Supplement to BLM Manual 6621 in appendix 9) or with the Wilderness Act of 1964.

Elements of the grazing management system proposed for 4001 Dominguez allotment include unacceptable chainings and pipeline construction. They go beyond the allowable minimal development criteria. However, section G.8 of the Dominguez AMP (4001) states: "Implementation of the proposed grazing system will be delayed until after completion of the Little Dominguez review and will be coordinated with its findings (tentatively scheduled for FY 80)."

The Roubideau drainage near Camel Back is a 5,000-acre roadless tract which appears to meet preliminary criteria used to determine wilderness character. The improvements proposed for 4010 Monitor Mesa are unacceptable under those criteria.

Summary

Although hunting and fishing may receive minimal impacts, the degree of impact would be so insignificant as to be unquantifiable. Chainings and pipeline construction proposed in the 4001 Dominguez AMP would definitely produce adverse impacts on the existing recreation management in the Dominguez Creeks area. Furthermore, these range improvements would not be consistent with current BLM primitive area management policy.

Agriculture

The agriculture section analyzes the impacts of the proposed action on farming and livestock grazing in the ES area.

Farming

Implementation of the proposed action in the ES area would have no impact on crop production not related to livestock grazing. Later turnout dates and no spring grazing during some years, as proposed in some of the AMPs, would result in livestock being held on private lands for longer periods in the spring. As shown in table 3-16, operators of 28 allotments proposed for later turnout dates, would have to defer irrigation or continue feeding hay until cattle are moved to spring ranges, which would shorten the growing season or increase the demand for forage crops. The hay loss associated with the shorter growing season would be about one ton per acre average for the ES area. Fourteen allotments would have spring grazing abolished altogether, while 13 one-pasture allotments would have no spring grazing some years (two out of three or three out of four years

there would be no spring grazing). However, on 21 allotments where fall grazing is being initiated or increased, forage needs could be balanced by individual operators by the end of the first year.

Livestock Grazing

Upon implementation of the proposed action, grazing use on NRL would total 33,317 AUMs annually for the first few years. Reductions in grazing use from the present active licensed use (35,369 AUMs) to the proposed use (33,317 AUMs) total 2,052 AUMs annually. The reduction from present active licensed use amounts to a reduction of 5.8 percent annually, which would be an adverse effect to the ES area for the first few years. Effects on operators of differences of AUMs and season of use are summarized by allotment in table 3-16. Impacts of these effects are unquantifiable and unidentifiable.

Over the long term (by 2006), assuming the active grazing qualifications of the permittees (40,479 AUMs, i.e., present active use qualifications of 40,705 AUMs minus 226 AUMs proposed to be eliminated) are filled by future increases in productivity (refer to table 3-8), the increase in annual active licensed use would be 5,110 AUMs, or an increase of 14.5 percent ([40,479 − 35,369] ÷ 35,369 × 100 percent = 14.448 percent) over present active licensed use.

If the quality (vigor) and quantity of forage improve after implementation as stated in the vegetation section of this chapter, it is possible that the quality of AUMs would increase so that weight gains or productivity would also increase slightly or that additional AUMs might be made available for domestic livestock use.

Livestock management through the proposed AMPs would entail moving livestock more often than under present management, and in some cases longer distances. Construction of range improvements would require livestock operators to maintain these in a serviceable condition. Both of these would require additional labor.

According to the proposed action for the area, there would be some increases and decreases in active licensed use for implementation of the individual grazing systems. As table 3-16 suggests, in a few cases reductions in active licensed use would be significant (as much as 597 AUMs for 4017 Alkali Flats allotment). In the case of one-pasture rest rotation systems, reductions of up to 33 percent in average annual use for a three or four year cycle would be severe on individual operators. The actual degree of severity would depend on the quantity and quality of other private and public rangelands owned and leased by the operator. Smaller operators would be the most severely affected. However, in most cases it is probable that the operator could accommodate the necessary adjustment through a change in use patterns on privately owned land. Furthermore, some of the adverse impacts would be mitigated over the long term (by 2006) as forage productivity increases.

The livestock grazing impacts from the proposed action are rather insignificant when compared with the total demand (including USFS, private, etc.) for AUMs in the ES area. Of an estimated 1,510,800 AUMs required in 1974, an increase of 5,110 AUMs would represent only 0.34 percent of the total.

Summary

As proposed in some AMPs, later turnout dates and no spring grazing during some years would require livestock to be held on private lands later into the spring, which would shorten the growing season, or increase the demand for forage crops. However, forage needs could be balanced on 21 allotments where fall grazing is being initiated or increased. For livestock grazing, in spite of some individual and short-term adverse impacts, it appears the overall net impact of the proposal would be beneficial, resulting in 5,110 additional AUMs of forage for livestock use.

Socio-Economic Conditions

The socio-economic section deals with the impacts of the proposed action on ES area population, income (including range livestock-related income, contract construction-related income, recreation-related income, and government-related income), employment, social well-being, public finance and tax base, and finally socio-cultural attitudes. Relevant methodologies and computations not contained in this section can be found in appendix 10.

Income

As noted in chapter 2, the ES area suffers an inferior income position relative to the state as a whole. The proposed action would generate impacts in four sectors of the economy.

TABLE 3-16
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
4001 Dominguez*	5,600	1,833	7,250	2,068	+235	4,800	10/16 - 05/30	04/16 - 05/15 10/16 - 01/30
4002 Lower Escalante	335	300	375	300	0	300	01/09 - 01/30	01/09 - 01/30
4005 Fall Cabin	40	18	40	18	0	18	05/11 - 05/31 10/16 - 10/31	05/11 - 05/31 10/16 - 10/31
4006 Dry Mesa*	1,185	883	1,585	665	-218	876	12/01 - 12/31 05/08 - 05/31 11/01 - 12/31	04/25 - 05/31 05/08 - 05/31 11/01 - 12/31
4007 Sawmill Mesa*	790	536	1,210	341	-195	600	05/01 - 05/31 10/16 - 12/15	11/01 - 12/15
4008 25 Mesa	810	644	985	773	+129	644	05/06 - 05/20	05/03 - 05/05 10/15 - 02/28
4010 Monitor Mesa	1,435	1,174	1,680	1,174	0	1,173	05/16 - 05/31	05/16 - 05/31 10/16 - 11/30
4011 Lower Roubideau Canyon	45	89	65	27 (Trailing)	-62	35	10/06 - 10/21	05/15 - 05/20 10/15 - 10/20
4012 Canal	1,000	831	1,220	831	0	822	05/15 - 07/31 10/16 - 11/15	05/15 - 07/31 10/16 - 11/15
4013 Ben Lowe	570	446	755	446	0	432	05/21 - 05/31 10/16 - 11/30	05/21 - 05/31 10/16 - 11/30
4014 Joker	115	87	150	87	0	87	05/21 - 10/31	05/21 - 10/31
4015 White Ranch	25	10	35	10	0	10	04/01 - 05/31 10/16 - 02/28	04/01 - 05/31 10/16 - 02/28
4016 Wells Gulch	2,680	2,380	3,145	2,365	-15	2,366	11/15 - 04/30	11/15 - 04/30
4017 Alkali Flats*	3,560	2,651	4,130	2,054 (4 yr. avg.)	-597	3,061	03/01 - 02/28 10/15 - 10/30	12/11 - 05/07
4021 Point Creek	115	0	135	77 (4 yr. avg.)	+77	101	03/15 - 05/20	03/15 - 05/20 10/15 - 12/20
4022 Petrie Mesa	1,430	1,258	1,430	1,258	0	1,163	12/01 - 04/30	12/01 - 04/30
4024 Dirty George	300	236	340	246	+10	243	05/16 - 06/15 10/16 - 11/15	05/16 - 06/15 10/16 - 11/15
4025 Ward Creek-Doughspoon	700	441	1,020	435	-6	445	05/01 - 06/15 10/15 - 11/15	05/11 - 06/15 10/16 - 11/15
4026 Escalante Canyon	40	20	40	20	0	20	01/01 - 02/07	01/01 - 02/07
4501 Milk Creek	15	16	15	16	0	16	05/15 - 05/31 05/19 - 06/15	08/15 - 08/31 05/26 - 06/15
4502 Surface to Leroux	495	443	655	443	0	418	10/16 - 10/21	10/16 - 10/21
4503 Stingley Gulch	125	98	150	98	0	98	05/10 - 06/09	05/10 - 06/09
4504 Leroux Creek	195	249	260	190	-59	250	05/15 - 08/31	05/16 - 09/15

Note: Present production is based on Bureau of Land Management, Uncompahgre Basin Resource Area unit resource analyses and allotment management plans. For a discussion of methodology and data base for current and predicted production levels, refer to appendix 4. Predicted production is estimated for twenty years after full implementation of the proposal (i.e., 2006).

a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.

b/ Proposed use is the number of AUMs and the season of use to be licensed under the proposed action.

c/ Assumes that the active grazing qualifications of the permittees are filled by predicted increases in productivity.

* Annual license includes nonuse applied for in addition to use shown.

TABLE 3-16
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
4505 Juniper Knob	10	None	10	10	+10	4	05/01 - 06/15 01/11 - 02/10	05/01 - 06/30
4506 Oak Mesa	95	64	140	58	-6	68	01/11 - 02/10 05/01 - 06/15 06/16 - 09/15	06/23 - 06/30 08/15 - 08/28 09/15 - 09/21
4507 Jay Creek	1,030	879	1,350	1,033 (5 yr. avg.)	+154	1,034	05/16 - 10/30	05/16 - 10/30
4509 Upper Jay Creek	75	94	95	66	-28	66	05/20 - 09/30	05/20 - 06/15 09/15 - 10/30
4511 Overland	20	29	30	14 (License change)	-15	28	06/01 - 06/15 10/15 - 10/30	06/16 - 06/30 10/16 - 10/30
4512 East Roatcap	10	68	10	10 (License change)	-58	10	06/19 - 10/12	06/19 - 10/12
4513 Stevens Gulch	865	694	1,070	669	-25	720	05/01 - 06/30	05/16 - 06/15 09/01 - 10/30
4514 Upper Terror Creek	5	17	5	3	-14	16	09/15 - 10/15	09/15 - 10/15
4515 Freeman Gulch	70	53	70	53	0	53	06/01 - 10/31	06/01 - 10/31
4516 North Fork	2,630	1,079	3,380	1,143 (3 yr. avg.)	+64	1,860	11/05 - 07/19	05/10 - 05/22 11/16 - 05/04
4517 Coal Gulch*	770	484	1,000	440 (3 yr. avg.)	-44	568	05/01 - 08/05 10/23 - 11/13	05/01 - 07/24 10/01 - 11/13
4518 Pilot Creek	40	38	40	33	-5	33	06/16 - 07/30 10/11 - 11/12	06/16 - 07/30 10/11 - 11/12
4519 Muddy Creek	25	16	25	16	0	16	05/16 - 06/25	05/16 - 06/25
4520 Spring Creek	30	26	30	25	-1	26	06/11 - 06/15 10/06 - 10/20	06/12 - 09/15
4521 Stock Driveway	10	6	10	6	0	5	06/16 - 07/30 10/20 - 11/12	06/01 - 06/06 11/01 - 11/06
4522 Downing	30	22	30	24	+2	27	05/26 - 06/17 09/16 - 09/30	05/26 - 06/17 09/16 - 09/30
4523 Williams Creek	10	8	10	8	0	8	05/16 - 07/15	05/16 - 07/15
4524 Deep Creek	10	3	10	3	0	4	06/01 - 10/15	06/01 - 10/15
4525 Anthracite Creek	170	118	210	117	-1	117	06/04 - 09/15	06/04 - 09/01
4526 Crystal Creek	60	51	60	51	0	50	05/16 - 09/30	05/16 - 09/30
4527 Jumbo Mountain	700	413	860	574	+161	575	05/11 - 06/15 05/21 - 06/15	05/11 - 06/15 09/16 - 10/20
4528 Oak Ridge	335	210	400	238	+28	244	05/21 - 06/15 06/11 - 06/20	05/21 - 06/15 10/16 - 11/04
4529 Reynolds Creek	190	158	210	158	0	159	06/11 - 06/20 10/06 - 10/07	06/15 - 06/20 10/06 - 10/11

* Annual license includes nonuse applied for in addition to use shown.

TABLE 3-16

A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
4530 McDonald Mesa*	205	100	310	122	+22	122	06/01 - 06/20	06/01 - 06/20 10/07 - 10/13
4531 Popp Ranch	15	8	15	4	-4	4	05/15 - 06/14 11/15 - 12/25	05/15 - 06/14
4532 McDonald Ranch*	725	536	815	546	+10	546	03/01 - 05/31 10/01 - 02/28	04/06 - 05/15 10/06 - 10/30 12/01 - 02/28
4535 Home Place	15	15	15	15	0	15	03/21 - 05/08 10/07 - 10/15	10/07 - 10/15
4536 West Young's Peak	10	6	15	6	0	6	05/01 - 07/31	05/01 - 07/31
4537 Young's Peak	240	171	280	135 (4 yr. avg.)	-36	175	05/15 - 07/14 09/01 - 09/30	05/15 - 07/14 09/01 - 09/30
4538 Missouri Flats	5	4	5	4	0	4	06/12 - 09/15	06/12 - 09/15
4539 Cottonwood Creek	10	10	10	8	-2	10	05/20 - 06/03 09/15 - 09/29	05/20 - 06/03 09/15 - 09/29
4540 North Saddle Peak	40	31	45	33	+2	34	06/01 - 08/31	06/01 - 08/31
4541 Sunshine Mesa	5	5	5	5	0	5	05/15 - 09/14	05/16 - 06/15
4543 South Saddle Peak	20	13	20	13	0	13	06/16 - 06/20 10/10 - 10/15	06/16 - 06/20 10/10 - 10/15
4548 Creek Bottom	10	5	10	5	0	5	06/01 - 10/15	06/01 - 10/15
4549 Dry Creek*	265	135	410	193 (2 yr. avg.)	+58	183	05/12 - 06/15 10/16 - 10/20	05/16 - 06/15 10/01 - 11/03
5002 Dedication Site	100	213	100	44 (License change)	-169	44	03/01 - 04/30	03/01 - 04/06
5003 Selig Canal*	725	330	815	410 (3 yr. avg.)	+80	554	05/16 - 05/25 10/01 - 10/10 12/15 - 02/16	05/16 - 05/25 10/01 - 10/10 12/16 - 01/23
5008 Brush Point	1,755	1,123	2,315	1,150	+27	1,153	11/14 - 05/06	11/14 - 03/02
5010 Dead Horse	200	171	250	113	-58	170	05/11 - 10/25	05/20 - 06/19 09/16 - 10/15
5011 Gould Reservoir	390	305	470	203 (3 yr. avg.)	-102	305	05/05 - 06/30 09/05 - 10/31	05/05 - 06/30
5012 Cedar Point	80	55	80	55	0	55	05/10 - 07/09	05/30 - 06/30 09/01 - 09/30
5013 Iron Canyon	135	95	175	63 (3 yr. avg.)	-32	95	05/06 - 06/30	05/15 - 07/10 09/06 - 10/31
5014 Poison Spring	145	99	210	66 (3 yr. avg.)	-33	99	05/01 - 06/30	05/15 - 07/14 09/01 - 10/31
5015 Grizzly Gulch	260	349	300	230 (3 yr. avg.)	-119	345	05/11 - 08/12	05/11 - 05/27 08/16 - 09/02

* Annual license includes nonuse applied for in addition to use shown.

TABLE 3-16
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
5016 Black Canyon	45	82	50	45	-37	79	05/11 - 06/30	05/11 - 06/30 10/11 - 10/30
5017 Green Mountain*	2,825	1,647	3,725	1,660	+13	1,660	05/03 - 11/25	05/15 - 07/14 09/15 - 11/12
5020 Black Ridge	605	400	765	400	0	400	11/16 - 01/15	04/04 - 08/31
5022 Rabbit Gulch	70	35	70	35	0	35	11/10 - 12/14	11/10 - 12/14
5025 Fruitland Mesa	5	2	5	2	0	2	05/01 - 11/30	05/01 - 11/30
5026 Star Nelson Airport	5	11	5	5	-6	11	01/02 - 02/28	01/02 - 02/28
5027 Adobe	30	24	35	24	0	24	05/01 - 05/30	05/15 - 06/14
5028 Doug Creek	70	60	80	40 (3 yr. avg.)	-20	60	05/01 - 06/15	05/16 - 06/15 09/01 - 09/30
5029 Spring Gulch	150	110	180	110	0	111	06/01 - 09/20	06/01 - 09/20
5030 Bostwick Park	380	188	450	159 (3 yr. avg.)	-29	188	04/16 - 10/31	04/21 - 06/15 09/15 - 12/03
5033 Pinyon Springs	160	132	160	131	-1	131	05/16 - 10/31	06/02 - 10/16
5036 Big Gulch	5	5	5	5	0	6	04/01 - 04/30	11/01 - 11/30
5037 Black Mesa**	0	6	0	0	-6	0	07/01 - 07/20	None
5038 Red Canyon	5	3	5	3	0	2	05/10 - 10/30	05/10 - 10/30
5039 Onion Valley	20	17	20	17	0	17	07/01 - 09/05	07/01 - 11/15
5040 Pine Ridge	15	14	15	14	0	14	06/01 - 11/15	06/01 - 11/15
5041 East Gould Reservoir	40	20	60	20	0	20	06/06 - 06/15	06/06 - 06/15
5043 Collins	15	10	15	10	0	10	05/05 - 06/04	05/05 - 06/04
5044 Big Pasture	20	15	20	15	0	15	05/16 - 06/15	05/16 - 06/15
5045 Black Bullet	5	3	5	3	0	3	11/01 - 12/18	11/01 - 11/30
5046 Big Gulch*	35	0	40	35	+35	39	04/16 - 05/23	03/02 - 04/17
5047 Mesa Creek*	75	23	75	55	+32	55	06/01 - 10/15	05/01 - 10/15
5048 Morrow Point	40	8	40	8	0	8	05/20 - 06/10	05/20 - 06/10
5049 Smith Fork	30	19	45	19	0	19	05/01 - 06/10 11/06 - 11/15	11/01 - 11/06
5050 Allen Reservoir	30	23	40	24	+1	39	05/16 - 06/04 10/15 - 10/22	05/16 - 06/04 10/16 - 10/20
5502 Sandy Wash	940	707	1,140	707	0	707	12/01 - 03/16	12/01 - 03/16
5503 Green	50	39	65	24 (4 yr. avg.)	-15	39	05/25 - 06/19	05/30 - 06/19 10/20 - 11/12
5504 Roatcap	350	264	445	195 (4 yr. avg.)	-69	264	02/17 - 03/21	05/07 - 06/15 10/16 - 11/24
5505 Transfer	300	214	355	214	0	214	10/16 - 11/16	10/16 - 11/16

* Annual license includes nonuse applied for in addition to use shown.
** This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 3-16
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
5507 Pipeline	2,270	1,715	2,890	1,560	-155	1,973	11/11 - 11/26 12/07 - 06/09	03/16 - 05/09 10/16 - 12/07
5508 Government Springs	180	125	225	83 (3 yr. avg.)	-42	125	05/16 - 06/15 10/16 - 11/15	05/16 - 06/15 10/16 - 11/15
5509 Coal Creek	50	44	50	44	0	44	03/01 - 05/26 11/10 - 01/25	05/16 - 05/30 11/08 - 11/15
5510 Bald Hills	25	21	25	21	0	21	05/29 - 06/30 10/11 - 11/09	05/29 - 06/30 10/11 - 11/09
5511 Shavano Mesa	200	261	260	200	-61	260	12/20 - 02/06	12/20 - 02/06
5512 Franklin Mesa*	355	363	440	350	-13	447	12/16 - 02/26	12/16 - 02/26
5513 Dry Creek Basin*	410	440	535	300	-140	540	12/11 - 02/16	11/01 - 01/31
5514 East Fork Dry Creek	15	11	15	11	0	11	06/01 - 10/27	06/01 - 10/27
5515 Olathe Reservoir	15	18	15	17	-1	17	05/16 - 10/15	05/16 - 10/15
5516 Piney	800	557	1,110	557	0	557	06/01 - 10/31	06/01 - 10/31
5517 Spring Creek Canyon	35	52	35	35	-17	59	05/31 - 10/15	05/31 - 10/15
5518 Dave Wood	215	176	340	144	-32	178	04/15 - 05/06	09/15 - 10/04
5520 Lower Horsefly	965	665	1,105	664	-1	667	12/01 - 02/15 03/01 - 05/15	05/01 - 05/12 10/20 - 11/17 01/01 - 02/15
5521 Highway 90	445	265	685	265	0	313	04/02 - 06/07	03/25 - 06/02
5522 Beaver Hill	1,570	1,022	1,875	934	-88	1,026	05/16 - 06/30 10/01 - 10/20 12/08 - 12/28	05/16 - 06/30 10/01 - 10/20 12/08 - 12/28
5523 Horsefly	55	38	130	15 (4 yr. avg.)	-23	37	05/11 - 07/02 09/12 - 10/14	06/01 - 07/02 09/15 - 11/14
5524 Duckett Draw	15	20	20	6	-14	5	03/18 - 05/30 11/01 - 12/31	04/01 - 05/31 11/01 - 12/31
5525 Dry Creek	15	15	15	9	-6	17	03/01 - 05/20 12/01 - 02/28	09/20 - 10/19
5529 Log Hill	310	189	420	153	-36	189	05/16 - 06/13 10/16 - 10/31	05/16 - 06/13 10/16 - 10/31
5530 Billy Creek	265	150	550	137	-13	150	05/01 - 07/01 08/20 - 09/15	05/10 - 06/25 08/20 - 09/25
5532 Burro Ridge	20	15	25	15	0	15	05/01 - 06/15	08/16 - 09/30
5533 Onion Lakes	35	15	35	15	0	15	10/16 - 11/30	10/16 - 11/30
5534 Shin Park	300	251	300	187	-64	256	11/30 - 01/16	12/01 - 01/15
5535 Cedar Creek	10	6	10	6	0	6	06/01 - 06/30	06/01 - 06/30
5536 South Canal	120	60	120	57	-3	57	01/01 - 01/18	01/01 - 01/17
5538 Rock Ditch	5	9	5	5	-4	9	11/01 - 11/30	11/01 - 11/30
5540 Dry Gulch	930	808	1,035	795	-13	797	03/01 - 06/24 12/28 - 02/28	05/01 - 06/04 11/01 - 11/12 12/01 - 01/31

* Annual license includes nonuse applied for in addition to use shown.

TABLE 3-16
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Use (2006) (AUMs) c/	Present Season of Use	Proposed Season of Use b/
5542 Bosgal	5	9	10	5	-4	9	03/01 - 04/30 12/01 - 02/28	09/01 - 02/28
5543 Waugh	10	30	10	10	-20	40	12/16 - 02/28	12/16 - 02/28
5544 Kelly	5	2	5	2	0	4	11/01 - 12/15	11/01 - 12/15
5545 Henshaw	15	12	20	12	0	12	01/10 - 01/20	10/15 - 11/15
5546 Waterdog Basin	45	35	45	35	0	34	03/20 - 10/30	03/20 - 10/30
5547 Slagel Pass	40	30	40	30	0	30	07/28 - 09/27	07/28 - 09/27
5548 Washboard Rock	55	34	55	34	0	34	05/16 - 09/15	05/16 - 09/15
5549 High Park	110	61	110	61	0	61	07/01 - 09/30	07/01 - 09/30
5551 Dexter Creek	5	3	5	3	0	3	06/01 - 06/21	06/01 - 06/21
5552 Dallas	15	24	20	0	-24	0	09/01 - 10/01	None
5553 Fisher Creek	40	34	50	0	-34	0	05/01 - 05/31	None
5555 Taylor Draw	25	55	30	0	-55	0	05/01 - 05/30	None
5556 Burro Creek	10	15	15	0	-15	0	03/01 - 05/15 10/15 - 02/28	None
5557 Alkali	40	20	50	0	-20	0	12/15 - 02/28	None
5559 South Fork	15	12	20	0	-12	0	05/01 - 05/31	None
5560 Cookie Tree	50	57	65	0	-7	0	07/20 - 10/04	None
5561 East Fork	5	14	5	5	-9	14	06/15 - 07/31 10/01 - 10/31	06/15 - 07/31 10/01 - 10/31
5562 Hillside	10	40	15	10	-30	20	06/01 - 09/30	08/15 - 09/30
5563 Moonshine Park	10	7	10	7	0	7	07/01 - 09/30	07/01 - 09/30
5564 Gravel Pit	5	4	5	4	0	4	10/01 - 12/15	10/01 - 11/08
5565 Tommy Creek	20	18	20	3	-15	18	05/05 - 06/13 12/15 - 02/28	04/16 - 06/15
5566 Cow Creek	105	70	120	80	+10	80	06/20 - 07/10	06/20 - 07/30 09/01 - 09/20
5567 Busted Boiler	5	2	5	2	0	2	08/01 - 09/30	08/01 - 09/30
5568 Baldy	135	88	165	67	-21	88	06/01 - 09/30	08/16 - 09/30
5569 Hairpin	30	18	40	19 (3 yr. avg.)	+1	18	05/16 - 05/30 10/01 - 10/10	10/01 - 10/06
5570 Cedar	375	315	470	236	-79	315	05/01 - 06/30	05/15 - 06/14 10/17 - 11/16
5572 McKenzie Creek	10	5	15	0	-5	0	05/01 - 10/31	None
5574 Tappan Creek	20	11	20	11	0	12	04/11 - 05/10	04/11 - 05/10
TOTALS	51,315	35,369	63,960	33,317	-2,002	40,479		

RANGE LIVESTOCK-RELATED INCOME

Allowable livestock use (active use qualifications) on BLM lands in the ES area is presently 40,705 AUMs annually. This number is expected to decrease to 40,479 AUMs at implementation of the proposed action (40,705 minus 226 AUMs proposed for elimination). Active licensed use is less than allowable use, being 35,369 in 1975, and is proposed to decrease to 33,317 when the proposal is initiated. This would be a 2,052 AUM reduction in active licensed use, which would result in a short-term decrease in range livestock-related income (in 1970 dollars) of $5,950.80 (2,052 × $2.90 = $5,950.80). Given the range livestock multiplier of (1.487), total direct and indirect income effect of this short-term decrease would be $8,848.84 ($5,950.80 × 1.487 = $8,848.84). This is not a significant amount when compared with 1974 ES area total livestock-related income of $6,515,023 and total personal income of $155,345,000.

Over the longer term, productivity of the vegetative resource is expected to reach a level where active licensed use would exceed the present level. By the year 2006 (as indicated in the livestock grazing section), it is expected that 40,479 AUMs of qualification would be active licensed use. This would be an increase of 5,110 AUMs over the 1975 active licensed use level and would result in an increase in direct range livestock-related income of $14,819 (5,110 × $2.90 = $14,819). The resulting total direct and indirect livestock-related income would be $22,035.85 ($14,819 × 1.487 = $22,035.85). Thus, although a positive income impact, it would be relatively insignificant, with the ES area increase in direct range livestock-related income being 0.338 percent of 1974 direct range livestock-related income and the total direct and indirect range livestock-related income being 0.014 percent of 1974 total personal income.

CONTRACT CONSTRUCTION-RELATED INCOME

Implementation of the proposal would yield the improvements and costs shown in table 3-2, under Assumptions and Analysis Guidelines. As this table shows, construction costs over the implementation period would total $1,788,164. (All costs given in table 3-2 are in 1976 dollars. Since the magnitude and duration of future monetary cycles is presently unknown, those using these data must make adjustments based on their own expectations about the future.)

If an estimated 20 percent of total construction costs is retained by ES area households, the annual income impacts of the proposal would be the amounts shown on the bottom line of table 3-2. These amounts represent 0.951 percent, 0.885 percent, 0.467 percent, 0.591 percent, 0.519 percent, 0.491 percent, and 0.302 percent respectively of the 1974 ES area contract construction income of $8,503,000 for the seven years involved. Although not large, these annual impacts would occur in an area where incomes are generally low. The actual magnitude and significance of these impacts are dependent upon the number of contractors and labor force employed from the ES area.

Annual expenditures for maintenance represent an ongoing impact in the area. Table 3-2 summarizes by improvement type the maintenance impacts based on maintenance rates estimated as a percentage of initial costs. Upon completion of the proposed improvements, annual maintenance costs would be $65,290, or 3.65 percent of initial construction costs. Since maintenance is more labor intensive than construction, it is assumed that 30 percent of maintenance costs would be retained by area households as income. Thus, the annual income effect would be $19,587. These annual maintenance costs represent 0.23 percent of 1974 ES area contract construction income. As is the case with initial construction, the impacts could be maximized if local contractors and labor were utilized.

The maintenance costs have both positive and negative dimensions. On the positive side, the increased income to area residents would be welcome. However, much of the actual annual maintenance would be assumed by permittees (i.e., fences, springs, and cattleguards—$10,328) as a condition of AMP implementation. Therefore, it would be viewed by ranchers as an additional operating cost and could have an inflationary impact on some individual operators depending upon whether or not additional AUM usage generates income sufficient to cover their additional cost of operating. Thus, it appears that some of the beneficial income impacts on construction workers, ranch hands, etc., would come at the expense of livestock operators.

RECREATION-RELATED INCOME

In chapter 2 it was indicated that hunting and fishing expenditures in the three-county ES area possibly accounted for $6.35 million of income in

1973. A previous section in this chapter (Wildlife), indicated that the proposal would provide habitat for expanded big game populations. The increases in numbers of animals by species would be elk, 96 to 156; deer, 2,200 to 4,500; and antelope, 53 to 73. These numbers represent increases of 8 to 13 percent, 15 to 30 percent, 21 to 29 percent respectively.

By applying these increases to hunters' expenditures by game species, as reported in *A Survey of Sportsmen Expenditures for Hunting and Fishing in Colorado, 1973* (Colorado State University 1975), it is possible to obtain expected hunter expenditure changes in the ES area. (See appendix 10, Methodology for Estimating Sportsmen Expenditure Changes Resulting from Changes in Wildlife Population.) Hunters' expenditures would increase between $221,832 and $444,937 (1973 dollars), providing that game management practices would allow population increases consistent with NRL habitat improvement.

If about 20 percent of these expenditures were retained as income to ES area residents, the area income impact would be an addition of between $44,366 and $88,987. This impact would be small when compared with total ES area income, yet it is an impact which would generate additional income and employment. The increased big game population would provide the basis to help satisfy demands for hunting opportunities.

As indicated in the recreation section of this chapter, in the case of all three big game species, data suggest that while hunting demand is increasing regardless of the proposed action, the proposal would assist the DOW in achieving stated objectives as well as providing consumptive and nonconsumptive use opportunities that would not otherwise exist. The economic impacts described above represent a best estimate of gross economic and income impacts of realizing the recreation effects.

GOVERNMENT-RELATED INCOME

Implementation of the proposed action assumes the hiring of four additional BLM employees: one range conservationist, one range technician, one engineering technician, and one wildlife technician. They would be needed to supervise installation of improvements, assist with maintenance, assure that grazing systems prescribed in AMPs are being followed, check for trespass, etc.

Annual salaries for the employees would total approximately $48,000, with travel, vehicle, and other associated expenditures being about $14,000. All four positions would be located in the ES area, which would receive the full impact of these additional incomes. Net salaries would be less than the amount indicated; however, the multiplier effect would increase local impacts to nearly the gross salary of $48,000. If about 20 percent of the $14,000 annual overhead expenditure is captured by area households, it would account for $2,800 in additional annual income.

Although the additional income would have a slight positive impact on the area's economy, it might be viewed as negative by taxpayers since the additional government expenditures could have a minor adverse impact on the federal budget, possibly contributing to additional inflation.

Employment

Additional employment would be generated by the proposed action. As indicated in the preceding section, government employment would be increased by four positions. This employment would begin when the proposal is initiated, continuing indefinitely during operation of the grazing systems. About 0.23 man-year of employment would be created from overhead expenditures.

During the seven year implementation phase, 29.80 man-years (assumes an average annual salary of $12,000) of construction employment would be generated, with the greatest yearly concentration coming in the first two years. After the eighth year, when all AMPs would be implemented, the maintenance income impact would generate an estimated 1.63 man-years of employment annually.

The wildlife (hunting) income impact would generate between 3.71 and 7.42 additional man-years of employment within twenty years after the proposal is implemented.

The additional income can be viewed as creating new jobs, whether it involves new work for existing employees or totally new employees. However, production of additional AUMs of grazing would not be likely to generate any new employment since existing ranches would probably experience some economies of scale and handle any expansion with the existing work force.

After implementation of the proposal, the total permanent employment impact would be an esti-

mated 9.57 to 13.28 man-years annually. Although a positive impact, it is relatively insignificant when compared with ES area estimated employment of 14,461 in 1974.

Social Well-Being

The discussions of income and employment in preceding sections indicate that the social well-being of the ES area would be improved slightly. However, considering the small magnitudes associated with the discussed impacts, there would not be a significant impact on area problems and deficits. The proposal cannot be viewed as an action that would correct existing inequities.

Public Finance and Tax Base

As indicated in a previous section, there would be a decrease in allowable AUM use (active use qualifications) from the presently licensed level of 40,705 to 40,479. The decrease in allowable use represents a decrease having economic value to the ranches associated with the use decreases. Therefore, the value of such ranches and of the ES area tax base would be decreased.

Studies suggest that the value of livestock ranches is about $1,000 to $1,200 per animal unit of carrying capacity. A decrease of 226 AUMs (40,705-40,479) would translate into a decrease of 18.83 animal units of allowable use, which would decrease the present value of future income and related improvements by about $18,830. This decrease or impact would be felt by present owners of affected ranches, and a related decrease would involve the tax base. In Colorado, property is generally assessed at about 30 percent of its market value. The decrease in the tax base would amount to about $5,649 or 0.007 percent of 1975 ES area assessed valuation (Colorado Department of Local Affairs 1975).

It should be noted that Colorado agricultural land prices reflect demand influences for land for considerations other than future ranch income. Therefore, the likelihood that ES area ranch property would appreciate is acknowledged. However, values of ranch property with decreased present value as a result of the proposal might be expected to increase at a slower rate than those similar properties experiencing no decreased carrying capacity. To assess the impact of decreased carrying capacity on individual operators, decreases in allowable licensed grazing levels would have to be viewed on an individual operator by operator basis.

Socio-Cultural Attitudes

To the extent that the proposed action would stimulate the region's economy, protect natural resource values by enhancement of the vegetative resource, increase wildlife populations, and increase domestic livestock grazing levels, the proposed action would be in harmony with existing area values and attitudes.

Some local resentment could occur as a result of the imposition of a more detailed management program and the addition of "federal employees" to implement the proposed action. However, a strong area sentiment favoring the installation of range improvements that would facilitate domestic grazing use could be expected to counter this attitude.

Summary

Income in all four categories would increase for the ES area. Annual direct livestock-related income would be increased by about $14,819 with the total direct and indirect income effect being about $22,036. Through the construction phase, area income would be increased by $357,633, with maintenance expenditures accounting for $19,587 income annually after the construction phase. Additional hunter expenditures would increase area income by an estimated $44,477 to $89,098 annually within twenty years of implementation. Additional federal government employees' salaries would account for an increase of about $48,000 in area income annually with overhead expenses adding another $2,800. The tax base would be slightly decreased by $5,649.

Upon initiation of the proposal, government employment would provide four year-round positions and about 0.23 man-year of employment from overhead expenditures. About 29.80 man-years of employment would be generated through the construction phase with operations and maintenance accounting for 1.63 annually thereafter. Within twenty years after implementation, hunter expenditures would account for an estimated 3.71 to 7.42 man-years annually.

Well-being of the area would be slightly improved by the proposed action. The proposed action generally appears to be in harmony with ES area values and attitudes.

Impact Summary

Table 3-17 summarizes the predicted results of the proposed action by resources or components.

TABLE 3-17
PROJECTED RESULTS OF PROPOSED ACTION AFTER TWENTY YEARS
IN COMPARISON WITH THE PRESENT STATUS OF THE ES AREA

Resources or Component	Unit	Present Status	Change By 2006
Soils			
Erosion condition classes	Acres		
Stable		32,260	+107,925
Slight		236,998	+100,917
Moderate		224,767	-180,602
Critical		28,320	- 24,810
Severe		3,430	- 3,430
Vegetation			
Range condition	Acres		
Good		74,990	+147,935
Fair		215,430	+ 70,535
Poor		235,355	-218,470
Production	AUMs	51,315	+ 12,645
Wildlife: Terrestrial			
Browse condition: mule deer crucial areas	Acres		
Good		4,575	+ 3,940
Fair		40,095	+ 1,430
Poor		69,075	- 5,370
Browse condition: elk crucial areas	Acres		
Good		0	+ 0
Fair		2,815	+ 0
Poor		8,445	+ 0
Browse condition: noncrucial areas	Acres		
Good		10,135	+ 9,590
Fair		105,255	+ 8,700
Poor		235,830	- 18,290
Wildlife Use	AUMs	17,998	+ 5,483
Populations	No.		
Mule Deer		15,000	+ 2,200 to + 4,500
Elk		1,200	+ 84 to + 156
Antelope		250	+ 53 to + 73
Wildlife: Aquatic & Riparian			
Riparian habitat	NRL Miles		
Excellent		12.4	+ 5.4
Good		45.4	- 2.5
Fair		60.8	+ 16.4
Poor		30.7	- 17.2
Nonexistent		13.5	- 2.1
Aquatic Habitat	NRL Miles		
Excellent		19.8	Slight improvement from present condition.
Good		62.9	
Fair		28.0	
Poor		20.1	
Nonexistent		32.0	
Agriculture: Livestock Grazing			
Livestock use	AUMs	35,369	+ 5,110

TABLE 3-17
PROJECTED RESULTS OF PROPOSED ACTION AFTER TWENTY YEARS
IN COMPARISON WITH THE PRESENT STATUS OF THE ES AREA (Cont.)

Resources or Component	Unit	Present Status	Change By 2006
Socio-economic Conditions a/			
Annual income	Dollars		
Direct livestock		4,381,320 b/	+ 14,819
Direct & indirect livestock		6,515,023 b/	+ 22,036
Contract construction		8,503,000 b/	
Implementation phase c/			+357,633
Annual maintenance			+ 19,587
Sportsmen expenditures		6,350,000 est. d/	+ 44,466 to + 88,987
Government		21,810,000 b/	+ 50,800
Tax base	Dollars	86,608,980 e/	- 5,649
Employment	f/	14,461 b/	+ 9.57 to + 13.28
Implementation phase c/	Man-years	-	+ 29.8

a/ The figures under "Present Status" represent varying base years and are presented only for general comparison. The figures presented under "Change by 2006," therefore, represent predicted net changes which are expected to occur annually by 2006.
b/ Base year is 1974.
c/ Initial seven year construction period; see table 3-2.
d/ Base year is 1973.
e/ Base year is 1975.
f/ "Present Status" indicates number of people employed in ES area in base year 1974; "Change by 2006" indicates predicted annual man-years by 2006.

CHAPTER 4

MITIGATING MEASURES NOT INCLUDED IN THE PROPOSED ACTION

MITIGATING MEASURES

The mitigating measures proposed in this chapter would reduce or eliminate adverse impacts of proposed improvements identified in chapter 3. All measures are considered feasible under existing technology and would be required if the proposed action is approved.

1. Range improvements proposed for allotment 4010 Monitor Mesa will be delayed a period of time necessary to conduct detailed, long-range studies of the populations of *Echinocereus triglochidiatus* var. *inermis* (*Ectr-inermis*) present on the allotment. These studies are needed to evaluate adequately the effects of the proposed range improvements on *Ectr-inermis*, since little is known at present about the nature of the *Ectr-inermis* populations or the factors which govern their distribution. The studies will involve long-range monitoring of the population dynamics, i.e., increase or decrease in population numbers and range, as well as an *Ectr-inermis* inventory of the entire allotment. They will require at least six field seasons, beginning in 1978. Should the planned studies conclude that some or all of the proposed range improvements are detrimental to the *Ectr-inermis* populations, those improvements will be dropped.

2. There is no apparent way to mitigate the proposed contour furrowing on allotment 5030 Bostwick Park (subunit V Adobe South) so that it would not harm significant populations of *Penstemon retrorsus*. Consequently, this vegetation modification will be dropped.

3. On allotment 5008 Brush Point, proposed interseeding will not be done on sections 11, 12, and 13 of Range 9W, Township 49N, and section 6 and 7 of Range 8W, Township 49N, as these sections contain significant populations of *Penstemon retrorsus*. The additional interseeding planned for allotment 5008 will be done only after the area has been thoroughly inventoried for *Penstemon retrorsus*. If *Penstemon retrorsus* is found, the interseeding will be laid out to avoid its populations.

4. Adverse impacts to cultural sites can be mitigated in a variety of ways. The preservation method or technique employed would be dependent on a number of factors, including the site and its significance, as well as the action involved. Preservation in this sense does not necessarily mean that each site must be maintained in an untouched condition but rather that some sites may require mitigation such as preservation through photographic records (see below).

Specific mitigating measures would be determined on a project by project basis. All appropriate compliance actions for Section 106 (Historic Preservation Act of 1966, as amended 1976) will be followed for any property included on or eligible for the National Register of Historic Places. Examples of types of mitigating measures that will be employed are cited below:

A. Avoidance
1. Through redesign of project (where possible) damage to cultural remains can be avoided.
2. Fencing of the cultural site would alleviate livestock rubbing or trampling of fragile cultural remains, thereby preventing adverse impacts.

B. Preservation through records. For sites that would be destroyed and whose significance is in the information they contain, photographic or other records will be prepared with copies filed with appropriate agencies.
1. Photographic records and measured drawings to Historic American Building Survey standards are required prior to demolition of a property included in or eligible for inclusion in the National Register of Historic Places (EO 11593 Sec. 2c).
2. Surface collection of cultural remains and recording of distribution of artifacts and features may be adequate in some instances.
3. Major excavation of an affected site according to a specified research design would be necessary when a significant site would be lost or greatly altered.
4. A salvage excavation would be considered only as a last resort, because it is generally a minimal effort.

C. Prosecution and Education
1. Prosecution of vandals may be one way to halt some of the illegal collecting and excavating of archeological sites.
2. Programs to educate the public about the significance and fragility of the nonrenewable resource may also help alleviate some vandalistic pressures.

Sites eligible for the National Register, such as the standing wickiups, and sites near springs, would require fencing or other approved protective measures. Adjustment of livestock grazing pressure is also a possible protective measure, as is patrol and surveillance. Regular monitoring of all sites, including those on or eligible for the National Register, would be carried out during routine patrol of the area. Routine patrol is carried out by trained cultural resources personnel in the district on an intermittent basis, usually during the spring and summer months. Generally, specific mitigation measures would be determined by the significance of the cultural resource and the degree of impact of the proposed undertaking.

Specific mitigating actions would be developed in consultation with the Colorado Historic Preservation Officer and the Advisory Council on

Historic Preservation in accordance with "Procedures for Protection of Historic and Cultural Properties" (36 CFR Part 800), pursuant to Section 106 of the National Historic Preservation Act of 1966 as amended September 28, 1976 (PL 94-422) and Executive Order 11593. Procedures established to implement Section 106 of the 1966 act (36 CFR Part 800) require that alternatives to avoid or mitigate adverse effects on cultural resources be considered in project planning. Generally, this will require the following:

A. Inventory of affected area prior to disturbance.
B. Evaluation of each cultural resource located for eligibility for inclusion in the National Register.
C. In consultation with the State Historic Preservation Officer (SHPO), determination of effect of the proposed action on properties included in or eligible for inclusion in the National Register.
D. Transmittal of findings of effect to the Advisory Council on Historic Preservation for comment with appropriate documentation, including comment of SHPO, depending on the type and extent of effect.
E. Avoidance or mitigation of effect.

The proposed action could result in adverse impacts to nine properties that meet criteria for inclusion in the National Register. These potential adverse impacts would be evaluated following compliance procedures when an implementation action that threatens the sites is proposed.

An additional inventory would be implemented at each allotment improvement project that could cause adverse impacts to cultural resources. Findings would be evaluated and compliance procedures followed.

Implementation of compliance procedures would prevent or mitigate losses to archeological resources by ensuring that the resources are located and evaluated as a part of the Bureau of Land Management (BLM) planning process prior to the initiation of any potentially damaging actions. It would also allow a determination of more suitable alternatives to avoid effects on cultural resources.

The courses of action outlined above would allow BLM to avoid or mitigate effects on cultural resources identified by archeological inventory. Should archeological materials be discovered during construction, the above cited treatment of cultural resources would be implemented by BLM through clauses and stipulations in leases and contracts.

5. Projects identified for 4010 Monitor Mesa will not be undertaken until proper studies have been completed to determine whether the Camel Back area meets criteria of the Wilderness Act of 1964.

MONITORING PROGRAMS

Resource monitoring programs would include evaluation studies which are part of the proposed allotment management plans (AMPs), plus other specific studies involving water resources, endangered and threatened plants, sage grouse populations, and aquatic and riparian habitats (described in following discussion).

AMP Evaluation Procedures

Evaluation procedures are built into each AMP. The grazing system on each allotment or allotment subunit would be evaluated at the conclusion of each grazing cycle through study procedures that would monitor the changes in plant composition and ground cover. Four studies are basic to the evaluation and each is discussed below:

A. Actual use data expressed in total animal unit months (AUMs) are based on livestock numbers and periods of use. Knowledge of how many livestock actually grazed the allotment is essential to proper evaluation. The permittees will keep records of actual livestock use on forms furnished by the BLM and will return this information on these forms to the area manager, fifteen days after termination of the grazing season. BLM employees will spot check livestock on the range from time to time.

B. Utilization. The percent of plant growth removed annually by grazing animals largely determines whether the productivity of the range will be lowered, maintained, or improved and thus directly influences range trend and condition. Records of utilization covering a period of years can help answer such questions as why some ranges deteriorate and nearby ranges improve. Utilization records provide management information needed to balance stocking with forage supply and to make needed adjustments in distribution of livestock on the range. Utilization studies will be run following grazing of each pasture during the initial cycle. Thereafter, utilization studies could be run once after each cycle, or as frequently as is necessary. Frequency of additional studies will be determined by the area manager.

C. Range Trend. Accurate interpretation of trend data requires sound judgment based upon

knowledge of the ecology of vegetation and soils. No single factor of the vegetation or the soil can be selected as the sole guide to trend. All factors must be carefully considered and evaluated. Management has a significant influence on the direction of trend and on the rate of change. One trend study will be established in each pasture prior to implementation of the grazing system. The trend plots will be photographed each year and read again at the end of the first cycle. Thereafter, they will be read after every second cycle.

D. Climate. The basic factors to be considered are temperature and precipitation which are significant because of their influence over growth processes. Relatively small climatic variations from year to year result in readily observable changes in plant growth. Although these changes may be temporary, they tend to influence the judgment of the nonprofessional in relation to range condition, trend, and production. In other words, abnormally good growing conditions give the appearance of improvement in range when, in fact, it is simply greater growth of the existing species. The professional resource manager looks for more permanent indications of improving trend (apparent over a period of several years) such as seedling establishment, increased size, and greater seed production of desirable plants. Climatic data will be collected, and current annual data for precipitation and temperature will be compared to average or normal conditions.

In addition, data on wildlife habitat utilization and trends and hydrologic response will be collected if pertinent to the resource values of the allotment.

If the evaluation procedures determine that the specific AMP objectives established for the allotments are not being achieved, modifications of the grazing systems would be made, or specific wildlife population recommendations would be made to the Colorado Division of Wildlife (DOW) to correct the adverse impacts on the habitat. Modifications (revisions) may include, but are not limited to, changes in the following: the grazing system, amount of use (livestock numbers), season of use, wildlife use, or any combination of these necessary to obtain the objectives. Any grazing system could be modified prior to evaluation if a deterioration in the resources on an allotment is apparent. If any modifications are needed, an environmental assessment report (EAR) would be completed prior to implementation of the revised plan.

Water Resources

A study will be initiated by BLM personnel within the environmental statement (ES) area to monitor the various climatic, hydrologic, soil, plant cover, channel, watershed geometry, snowpack and infiltration parameters. Information from these studies would be used to make recommendations for changes in the proposed grazing systems should they begin to produce adverse impacts.

Two sets of paired watersheds will be selected, each pair having different sets of soils, climatic, and geologic conditions. The watersheds will be instrumented and calibrated before being subjected to the best grazing system recommended for the area. In addition to allowing guidance for mitigating measures, the results of this administrative catchment study would be used to quantify impacts not presently identifiable in this statement.

Sage Grouse Population

Studies to determine sage grouse population, limiting factors, and habitat requirement in the ES area will be a part of habitat management plans scheduled for completion by fiscal year 1980. Until proper studies are completed, suspected habitat of sage grouse would be maintained through proper grazing practices, which would involve maintaining a good sagebrush cover with a good balance of grasses and forbs as understory species (U.S. Department of the Interior 1970), as under the proposed action.

Aquatic and Riparian Habitats

Many AMPs have the objective of improving riparian and aquatic habitats, but conclusive studies on the effects of rest rotation systems on riparian and aquatic habitats that are applicable to the ES area are limited. Monitoring studies are essential to determine how effective intensive grazing management systems are in maintaining these resources. These studies will be used to modify AMPs as more information becomes available.

The direct impact on riparian vegetation will be determined through the use of three-stage enclosures, encompassing the stream and riparian zones. One-third of a 200-foot square will be

fenced against all livestock and big game use, one-third will be fenced against livestock use, and one-third will be grazed normally. Standard utilization studies will be run on these plots.

Standard water chemistry and physical measurements will be collected at predetermined intervals to obtain valid conclusions from the data. Emphasis will be placed on parameters such as stream discharge, water temperature, dissolved solids, turbidity, and suspended sediments which would provide an estimate of sediment discharge.

Biological data to determine aquatic habitat condition would best be obtained by sampling benthic invertebrates for total numbers and diversity. Streams representative of large areas of national resource lands would be utilized.

CHAPTER 5

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

The unavoidable impacts analyzed in this chapter are those adverse impacts which were analyzed in chapter 3 and were unmitigated or only partially mitigated in chapter 4.

Water Resources

Another unavoidable adverse impact of the proposed range improvements would be that no earthen reservoirs, or other structural channel controls could be designed so as to avoid failure in the event of very large, intense storms (those occurring no more than once in 75, 100, or 500 years). Such structural failure would bring with it the probability of a significant increase in channel erosion and flash flooding for a short period following the failure.

Vegetation

Under the proposed custodial management where season-long or continuous spring use occurs (22,645 acres), vigor, reproduction, litter accumulation, and seedling establishment would be reduced.

Wildlife

Terrestrial

Some disturbance of wildlife would occur as the range improvements and vegetation manipulations are implemented. Mobile animals would be displaced, and immobile animals (e.g. young birds incapable of flight, slower animals such as snakes, and young mammals in nests and burrows) would be killed. This would be during construction only and is not expected to be significant because of the relatively short duration.

Over the long term as a result of range improvements, big game could be injured or killed if they become entangled in fence wire; five deer annually could die as a result of this entanglement. Small mammals and birds would continue to drown in troughs even though drinking and resting ladders are provided.

Competition between livestock and big game would also result from three aspects of the proposal. First, chaining would cause a short-term increase in the competition among livestock, deer, and elk. This would last for approximately two years until browse and grass increase. Second, over the long term, competition between antelope and sheep would continue in the winter areas on antelope range. This competition would result in reduction of forage available to antelope and could slow population growth. Third, livestock would continue to congregate around watering troughs and trample and consume vegetation in the immediate vicinity of the trough, reducing wildlife forage.

Aquatic and Riparian

Grazing of riparian vegetation would continue to have adverse impacts on Monitor Creek, Roubideau Creek in the upper section, and Dry Creek on the West Fork and middle sections. Riparian wildlife species would decrease and the aquatic habitat would suffer from increased water temperature and stream bank erosion. The numbers of aquatic invertebrates and fish would be decreased.

Cultural Resources

Archeological Resources

Although archeological clearance is required prior to the initiation of any surface disturbing activities, some unintentional damage and destruction could still occur. Not all archeological sites would be identified in the archeological survey. In addition, other sites may be buried by alluvium and hidden from view. Damage to these unknown and subsurface sites not discovered during project inventories would be likely to occur.

Salvage excavations of sites could partially mitigate the loss of information. However, salvage archeology is in itself an unavoidable adverse impact. Once excavated, a site is effectively destroyed and removed from future research considerations, which may utilize different analytical techniques. Salvage is rarely as effective as non-salvage research programs because of more stringent time limitations, funding, and personnel availability. If the site could be left undisturbed and could be avoided by project redesign, then excavation could be postponed until more sophisticated methods and analytical devices are available. This would allow a greater potential for recovery of information.

Vandalistic damage from construction workers and NRL users would go unmitigated. Moreover, regulations against vandalism in themselves would do little to curb theft and vandalism due to increased visitor-use pressure.

Agriculture

Livestock Grazing

Short-term unmitigated impacts of the proposal include a total reduction from present active licensed use of 2,052 animal unit months (AUMs) until NRL livestock forage production meets the active use qualifications, and changes in individual livestock operations due to season of use changes and increased livestock handling.

Over the long term, a total reduction in grazing of 226 AUMs on NRL would result from eliminated grazing on nine allotments.

Socio-Economic Conditions

As indicated in chapter 3, maintenance of improvements associated with the proposed action could be a burden on some individual permittees depending upon whether or not additional maintenance costs assumed by them are greater than income generated from additional AUM usage. Information is lacking to detail the magnitude of the impact on an operator-by-operator basis.

Upon initiation of the proposal, annually licensed grazing would be reduced by 2,052 AUMs for a short term, after which licensed grazing would regain and exceed present use levels. This short-term reduction would reduce direct livestock related income by $5,950.80 and total direct and indirect income by $8,848.84. While this impact is not significant when compared with ES area total livestock related income, it could be viewed as an adverse impact on those operators directly affected.

Two situations discussed in chapter 4 as mitigating measures would involve improvements and costs not considered in the discussion of impacts in chapter 3. First, costs of an uncertain nature are associated with preservation of archeological materials, should they be discovered by archeological inventory or during construction. Second, there may be fencing costs for three historic sites which would require a total of 1 mile of fence, costing $3,600. Annual maintenance cost would be $72. Thus, added costs of an uncertain nature associated with archeological preservation would be an adverse impact should they materialize, as would additional fencing costs for historic sites.

The imposition of a more detailed management program could adversely affect a few local residents who would feel their rights to unrestrained resource use were being violated.

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This chapter discusses productivity of the environment which would be affected by the implementation and operation of the proposed action. The proposed action would be a long-term, reversible commitment of resources—watershed, vegetation, wildlife, etc.—that would require short-term commitment or trade-off of these resources. Short-term means the period of implementation, eight years. Long-term means at least twenty years after implementation.

Soils

Erosion in vegetation manipulations and range improvement areas would increase until stabilization can take place. In the long term, however, there would be an increase in the production potential of the soil due to increased organic matter, structure, tilth, permeability, and water-holding capacity. As a result, erosion rates would decrease.

Water Resources

There would be no detectable change in water or sediment yield during normal years due to grazing management during implementation.

The long-term result of implementation of grazing would be about a 30 percent net decrease in water yield from national resource lands (NRL) for large infrequent storms and consequently less soil erosion during these storms. However, no change would be detected with normal rainfall events. There would be a 2 to 30 percent reduction in runoff in local areas where catchments are to be installed but this reduction is insignificant in comparison with total runoff. In addition, runoff generated from normal storms seldom reaches a perennial stream. Long-term hydrologic commitments would be insignificant in the environmental statement (ES) area.

Vegetation

Considering all the proposed grazing systems, vigor, reproduction, seedling establishment, and litter accumulation would be reduced when pastures are grazed during the late spring and summer and increased when pastures are rested during the spring and summer. The order in which the treatments are applied as well as the treatments themselves would produce an increase in vegetal production of 12,445 animal unit months (AUMs) over the long term.

The range improvements would temporarily remove approximately 36 acres from vegetal production. The use would temporarily decrease on this land and increase on the lands adjacent to the project as wildlife and livestock adjust to the decreased vegetation. Construction and maintenance of the proposed range improvements and erosion control structures would permanently remove approximately 25 acres from vegetal production.

Wildlife

Terrestrial

Competition between wildlife and livestock would increase temporarily as operations are shifted to conform to the schedules in the allotment management plans (AMPs). Better control of the livestock, however, would give the wildlife an opportunity to increase due to the increased forage.

Long-term productivity of the wildlife would be increased by the improvements as more water is provided, thus opening more habitat for use; and as more forage is made available through reseeding of chainings, interseeding, and other vegetation manipulation. As a result, the vigor and number of animals would increase.

Aquatic and Riparian

Initial concentrations of cattle on smaller pastures before vegetation has sufficient time to increase would cause bank destruction, loss of riparian vegetation, and associated impacts on aquatic organisms. Range manipulations, such as cutting stock trails or constructing reservoirs, would cause short-term decreases in aquatic productivity due to increased turbidity and sediments in streams.

In the long term, riparian vegetation would improve and, as a result, cover for fish would improve. The increased vegetation would also improve the stability of stream banks.

Cultural Resources

Inventory and assessment of prehistoric and historic resources directly affected by the proposed action would provide immediate gains in scientific knowledge of the area and provide a data base for long-term gains.

Agriculture

Livestock Grazing

On the nine allotments where elimination of grazing is proposed, there would be no forage utilization by livestock (loss of livestock grazing of 226 AUMs present active licensed use). In addition, initially 2,052 AUMs would be lost to livestock grazing. However, as vegetative production increases by 2006 the total livestock use would be 40,479 AUMs, an increase of 5,110 AUMs over the present active licensed use.

Socio-Economic Conditions

Range-related income would initially be reduced as a result of a 2,052 AUM reduction in present active licensed use at the time of implementation. There would be a potential increase in income from hunting expenditures due to the potential increases in wildlife populations.

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This chapter identifies the irreversible and irretrievable commitment of resources resulting from the proposed action. The term irreversible is defined as use that is incapable of being reversed: once something is initiated, it would continue. The term irretrievable means irrecoverable: once something is used, it is not replaceable.

The 25 acres which would be occupied by the range improvements would lose their capacity to produce vegetation for the life of the improvement. Except for the actual material destroyed or removed at the time of construction, none of the impacts on vegetation would be irreversible or irretrievable. Loss of forage for the area removed from production would be approximately 2 animal unit months (AUMs) annually for the life of the proposed projects.

Removal of vegetative cover due to implementation of range improvements would cause the loss of 880 tons of soil which would be considered irretrievable.

Proposed livestock grazing and development of facilities could disturb certain cultural resources, either through direct impact or through vandalism. Once disturbed, historical and archeological sites, as well as artifacts, are no longer available for future study. This can result in a data gap in the history of an area and would be considered an irretrievable commitment.

The proposed action would involve the commitment of material associated with the proposed improvements. Once installed, these materials would basically be irretrievably committed, although the materials might have some salvage value.

The major irreversible and irretrievable commitment would involve the costs of installation, maintenance, and administration of the proposal. Once the expenditures are made, those particular funds would not be available for other alternative public programs. An additional irretrievable commitment would be the labor associated with the proposal. Labor, too, once expended could not be retrieved.

CHAPTER 8

ALTERNATIVES TO THE PROPOSED ACTION

This chapter presents five alternatives to the proposed action. These alternatives include (A) Continuation of Present Grazing Program (no change in the present level of grazing management), (B) Elimination of Grazing (no livestock grazing would be allowed on national resource lands in the environmental statement area), (C) Custodial Management (grazing management reduced), (D) Reduced Livestock Grazing, and (E) Elimination of Grazing on Allotments with Soils in the Severe and Critical Erosion Classes.

The 152 allotments and 45 unallotted units identified in the proposed action would be considered in each of the alternatives. For comparison, impacts of all alternatives are projected to 2006, as in the analysis of the proposed action.

The objectives of these alternatives are similar to those included in the proposed action: the proper management and use of the renewable resources of national resource lands (NRL) in the environmental statement (ES) area.

ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM

Description

Alternative A, Continuation of Present Grazing Program, proposes no change in the present management. With this alternative, the Bureau of Land Management's (BLM's) existing range management program and policies would be continued. These programs and policies include adjustments in grazing levels as the need is identified through various activity plans, e.g., allotment management plans (AMPs), habitat management plans, and watershed plans; implementation of six new AMPs over the eight years following completion of the ES, including construction of associated range improvements; and trespass control through range use supervision. It is assumed that present levels of manpower and funding would be continued.

This alternative would be similar to the proposed action with respect to the types of grazing systems (rest rotation, deferred rotation, etc.), the range improvement projects (fences, water developments, etc.), and grazing administration. The difference between this alternative and the proposed action is the number of AMPs that would be implemented in eight years: the proposed action includes 14 existing and 56 proposed AMPs, while the no action alternative includes the following components (as summarized in tables 8-1 and 8-2):

1. The 14 existing AMPs would be continued and 6 additional AMPs would be implemented on a total of 168,600 acres of NRL within the proposed eight-year time frame. It is assumed that under the 14 existing AMPs the future productivity would achieve the levels indicated in table 3-6.

2. Present active licensed use would continue on 47 undivided allotments and 3 allotment subunits (covering 310,665 acres) until such time as implementation of AMPs could occur or other primary resource objectives are established.

3. Limited (one day each way) trailing use would be implemented on 4011 Lower Roubideau Canyon (480 acres).

4. Custodial management of 72 allotments and 5 allotment subunits (29,460 acres) would be continued.

5. Grazing would be eliminated on 9 allotments (3,020 acres) because these allotments either are unsuitable for livestock grazing or would be affected by the Dallas Creek project (which is discussed in chapter 1 under Interrelationships).

6. The 45 unallotted tracts (13,550 acres) would retain their unallotted, no grazing status.

In addition, implementation of the six AMPs listed in item 1 above would require the range improvements and vegetation conversion summarized in table 8-3. Design features for these projects would be the same as for those described in chapter 1. As shown in table 8-3, these projects would disturb approximately 3,059 acres during implementation and approximately 6 acres by 2006.

Analysis

Soils

As stated in chapter 3, hydrologic soil groups and soil infiltration rates were used in the simulation model to determine the hydrologic changes produced by the grazing management program. The hydrologic effect of grazing upon the six AMPs (79,300 acres) which would be implemented under Alternative A would be that under normal storm events there would be no detectable change in runoff and sediment yield. However, with the larger storm (50-year/24-hour) there would be a

TABLE 8-1
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED REST ROTATION GRAZING SYSTEMS					
Two-Treatment					
4006 Dry Mesa*:					
A Escalante Subunit	2,280	C-76	11/27 - 12/31	1	D, E
4503 Stingley Gulch*	1,080	C-98	05/10 - 06/09	2	A, E
5521 Highway 90*	6,215	S-265	03/25 - 06/02	6	A, E
Three-Treatment					
4013 Ben Lowe*	5,490	C-446	05/21 - 05/31 10/16 - 11/30	3	A, C, E
4528 Oak Ridge*	3,600	C-238	05/21 - 06/15 10/16 - 11/04	3	A, C, E
5017 Green Mountain	20,825	S-1,021	05/15 - 07/04 09/15 - 11/12	4	A, C, E
		C-639	05/15 - 07/14		
5020 Black Ridge	6,875	S-400	04/04 - 08/31	4	A, C, E
5507 Pipeline	19,190	C-1,560	03/16 - 05/09 10/16 - 12/07	5	A, C, E
Four-Treatment					
4006 Dry Mesa*:					
B Dry Mesa Subunit	16,165	C-489	05/08 - 05/31 11/01 - 12/31	4	A, C, E, D
4012 Canal*	10,650	C-831	05/15 - 07/31 10/16 - 11/15 10/15 - 10/30	4	A, B, C, E
4537 Young's Peak:					
Q Young's Peak Subunit*	2,260	C-113	05/15 - 07/14 09/01 - 09/30	1	A, C, E, C
5508 Government Springs	2,260	C-83	05/16 - 06/15 10/16 - 11/15	1	A, C, E, C
5520 Lower Horsefly:					
X Lower Horsefly Subunit	5,675	S-304	05/01 - 05/12 10/20 - 11/17	4	A, C, E, C
5522 Beaver Hill	19,785	S-934	05/16 - 06/30 10/01 - 10/20 12/08 - 12/28	5	A, C, E, D

a/ C = cattle; S = sheep; H = domestic horses; AUM = animal unit month.
b/ Applies only to rest rotation systems. Letters refer to rest rotation treatments A through E discussed in chapter 1 under the components section: A = spring grazing; B = summer grazing; C = fall grazing; D = winter grazing; and E = yearlong rest from livestock grazing.
* Already implemented.

TABLE 8-1

ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Five-Treatment					
5516 Piney*	8,335	C-540 H-17	06/01 - 10/31	5	A, B, C, E, B
		C- 5,113 S- 2,924 H- 17			
SUBTOTALS	130,685	8,054			
PROPOSED DEFERRED ROTATION GRAZING SYSTEMS					
4502 Surface to Leroux*	3,230	C-443	05/26 - 06/15 10/16 - 10/21	2	
4529 Reynolds Creek*	1,200	C-158	06/15 - 06/20 10/06 - 10/11	2	
4530 McDonald Mesa*	3,185	C-122	06/01 - 06/20 10/07 - 10/13	2	
4549 Dry Creek*	3,110	C-193	05/16 - 06/15 10/01 - 11/03	2	
SUBTOTALS	10,725	C-916 916			
PROPOSED DEFERRED GRAZING SYSTEMS					
4007 Sawmill Mesa*	12,095	C-341	11/01 - 12/15	1	
4008 25 Mesa*	10,405	C-773	10/15 - 02/28 05/03 - 05/05	1	
5520 Lower Horsefly: Y Dry Cedar Subunit	4,690	S-360	01/01 - 02/15	1	
		C-1,114 S- 360			
SUBTOTALS	27,190	1,474			
PROPOSED TRAILING USE					
4011 Lower Roubideau Canyon	480	C-27	05/15 - 05/20 10/15 - 10/20		
SUBTOTALS	480	C-27 27			

* Already implemented.

TABLE 8-1

ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
CONTINUATION OF PRESENT LICENSED USE c/					
4001 Dominguez***	58,335	C-1,833	10/16 - 05/30		
4002 Lower Escalante	2,240	S-300	01/09 - 01/30		
4010 Monitor Mesa	15,735	C-1,174	05/16 - 05/31		
			10/16 - 11/30		
4016 Wells Gulch	16,955	S-2,380	11/15 - 04/30		
4017 Alkali Flats***	27,830	S-2,651	03/01 - 02/28		
			10/15 - 10/30		
4021 Point Creek	1,000	S-101	03/15 - 05/20		
4022 Petrie Mesa	13,860	S-1,258	12/01 - 04/30		
4024 Dirty George	2,385	C-236	05/16 - 06/15		
			10/16 - 11/15		
4025 Ward Creek-Doughspoon	17,910	C-441	05/01 - 06/15		
			10/15 - 11/15		
4504 Leroux Creek	2,555	C-190	05/15 - 08/31		
4506 Oak Mesa	1,350	S-64	01/11 - 02/10		
			05/01 - 06/15		
			06/16 - 09/15		
4507 Jay Creek	9,205	C-879	05/16 - 10/30		
4513 Stevens Gulch	6,555	C-694	05/01 - 06/30		
4516 North Fork	23,420	S-1,079	11/05 - 07/19		
4517 Coal Gulch***	7,720	S-394	05/01 - 08/05		
		C-90	10/23 - 11/13		
4525 Anthracite Creek	1,115	C-118	06/04 - 09/15		
4527 Jumbo Mountain	4,970	C-413	05/11 - 06/15		
4532 McDonald Ranch***	7,330	S-529	03/01 - 05/31		
		H-7	10/01 - 02/28		
4540 North Saddle Peak	240	C-31	06/01 - 08/31		
5003 Selig Canal***					
S Selig Canal Subunit	5,660	S-298	10/01 - 10/10		
			12/15 - 02/16		
5008 Brush Point	18,205	S-1,123	11/14 - 05/06		
5010 Dead Horse	955	C-170	05/11 - 10/25		
5011 Gould Reservoir	2,825	C-305	05/05 - 06/30		
5013 Iron Canyon	1,335	C-95	05/06 - 06/30		
5014 Poison Spring	1,570	C-99	05/01 - 06/30		
5015 Grizzly Gulch	1,930	C-230	05/11 - 08/12		
5016 Black Canyon	440	C-45	05/11 - 06/30		
5028 Doug Creek	400	C-60	05/01 - 06/15		
5029 Spring Gulch	1,430	C-110	06/01 - 09/20		
5030 Bostwick Park:					
U Black Canyon-Jones Draw Subunit	1,655	C-89	04/21 - 10/21		
V Adobe South Subunit	3,480	C-95	04/16 - 05/15		
			10/01 - 11/10		

c/ Present active licensed use would continue until such time as implementation of an AMP could occur or other primary resource objectives are established.

*** Annual license includes nonuse applied for in addition to use shown.

TABLE 8-1

ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
CONTINUATION OF PRESENT LICENSED USE c/ (Cont.)					
5049 Smith Fork	450	C-19	05/01 - 06/10 11/06 - 11/15		
5502 Sandy Wash	7,530	S-707	12/01 - 03/16		
5503 Green	450	C-39	05/25 - 06/19		
5504 Roatcap	3,070	S-264	02/17 - 03/21		
5505 Transfer	2,970	C-214	10/16 - 11/16		
5511 Shavano Mesa	2,015	S-200	12/20 - 02/06		
5512 Franklin Mesa***	3,600	S-350	12/16 - 02/26		
5513 Dry Creek Basin***	5,425	S-300	12/11 - 02/16		
5518 Dave Wood	2,565	S-176	04/15 - 05/06		
5523 Horsefly	640	C-38	05/11 - 07/02 09/12 - 10/14		
5529 Log Hill	4,345	C-189	05/16 - 06/13 10/16 - 10/31		
5530 Billy Creek	3,995	C-148 H-2	05/01 - 07/01 08/20 - 09/15		
5532 Burro Ridge	200	C-15	05/01 - 06/15		
5534 Shin Park	3,970	S-251	11/30 - 01/16		
5540 Dry Gulch	4,860	S-808	03/01 - 06/24 12/28 - 02/28		
5562 Hillside	160	C-10	06/01 - 09/30		
5566 Cow Creek	520	C-70	06/20 - 07/10		
5568 Baldy	680	C-88	06/01 - 09/30		
5569 Hairpin	500	S-18	05/16 - 05/30 10/01 - 10/10		
5570 Cedar	2,125	C-315	05/01 - 06/30		
SUBTOTALS	310,665	C- 8,543 S-13,251 H- 9 21,803			
PROPOSED CUSTODIAL ALLOTMENTS					
4005 Fall Cabin	360	C-18	05/11 - 05/31 10/16 - 10/31		
4006 Dry Mesa:					
C Smith Ranch Subunit	150	C-50	04/25 - 05/31		
D Escalante Creek Subunit	300	C-50	04/25 - 04/27		
4014 Joker	1,835	C-87	05/21 - 10/31		
4015 White Ranch	415	C-10	04/01 - 05/31 10/16 - 02/28		

*** Annual license includes nonuse applied for in addition to use shown.

TABLE 8-1
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (Cont.)					
4026 Escalante Canyon	1,270	C-20	01/01 - 02/07		
4501 Milk Creek	105	C-16	08/15 - 08/31		
4505 Juniper Knob	120	S-10	05/01 - 06/05		
4509 Upper Jay Creek	430	C-66	05/20 - 06/15		
			09/15 - 10/30		
4511 Overland	160	C-14	06/16 - 06/30		
			10/16 - 10/30		
4512 East Roatcap	30	C-10	06/19 - 10/12		
4514 Upper Terror Creek	30	C-3	09/15 - 10/15		
4515 Freeman Gulch	620	C-53	06/01 - 10/31		
4518 Pilot Creek	45	S-33	06/16 - 07/30		
			10/11 - 11/12		
4519 Muddy Creek	500	S-16	05/16 - 06/25		
4520 Spring Creek	120	C-25	06/12 - 09/15		
4521 Stock Driveway	120	S-6	06/01 - 06/06		
			11/01 - 11/06		
4522 Downing	120	C-24	05/26 - 06/17		
			09/16 - 09/30		
4523 Williams Creek	110	C-8	05/16 - 07/15		
4524 Deep Creek	160	C-3	06/01 - 10/15		
4526 Crystal Creek	480	C-51	05/16 - 09/30		
4531 Popp Ranch	265	C-4	05/15 - 06/14		
4535 Home Place	160	C-15	10/07 - 10/15		
4536 West Young's Peak	160	C-6	05/01 - 07/31		
4537 Young's Peak:					
R Crawford Subunit*	260	C-22	06/17 - 06/25		
4538 Missouri Flats	120	C-4	06/12 - 09/15		
4539 Cottonwood Creek	120	C-8	05/20 - 06/03		
			09/15 - 09/29		
4541 Sunshine Mesa	40	C-5	05/16 - 06/15		
4543 South Saddle Peak	220	C-13	06/16 - 06/20		
			10/10 - 10/15		
4548 Creek Bottom	185	C-5	06/01 - 10/15		
5002 Dedication Site	1,915	C-44	03/01 - 04/06		
5003 Selig Canal:					
T Rawhide-Coffeepot Subunit	2,005	S-32	05/16 - 05/25		
			10/01 - 10/10		
5012 Cedar Point	620	C-55	05/30 - 06/30		
			09/01 - 09/30		
5022 Rabbit Gulch	1,250	C-35	11/20 - 12/14		
5025 Fruitland Mesa	80	S-2	05/01 - 11/30		
5026 Star Nelson Airport	80	C-5	01/02 - 02/28		

* Already implemented.

TABLE 8-1
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (Cont.)					
5027 Adobe	300	C-24	05/15 - 06/14		
5030 Bostwick Park:					
W Bostwick Park Subunit	360	C-4	05/01 - 06/15		
5033 Pinyon Springs	1,030	C-131	06/02 - 10/16		
5036 Big Gulch	40	S-5	11/01 - 11/30		
5038 Red Canyon	80	C-3	05/10 - 10/30		
5039 Onion Valley	40	C-16	07/01 - 09/01		
		H-1	09/01 - 11/15		
5040 Pine Ridge	80	C-14	06/01 - 11/15		
5041 East Gould Reservoir	620	C-20	06/06 - 06/15		
5043 Collins	200	C-10	05/05 - 06/04		
5044 Big Pasture	200	C-15	05/16 - 06/15		
5045 Black Bullet	90	H-3	11/01 - 11/30		
5046 Big Gulch	440	S-35	03/02 - 04/17		
5047 Mesa Creek	640	C-55	05/01 - 10/15		
5048 Morrow Point	1,035	C-8	05/20 - 06/10		
5050 Allen Reservoir	200	C-24	05/16 - 06/04		
			10/16 - 10/20		
5509 Coal Creek	320	C-44	05/16 - 05/30		
			11/08 - 11/15		
5510 Bald Hills	205	C-21	05/29 - 06/30		
			10/11 - 11/09		
5514 East Fork Dry Creek	135	C-11	06/01 - 10/27		
5515 Olathe Reservoir	185	C-17	05/16 - 10/15		
5517 Spring Creek Canyon	440	C-35	05/31 - 10/15		
5524 Duckett Draw	275	C-6	04/01 - 05/31		
			11/01 - 12/31		
5525 Dry Creek	100	C-9	09/20 - 10/19		
5533 Onion Lakes	630	C-15	10/16 - 11/30		
5535 Cedar Creek	240	C-6	06/01 - 06/30		
5536 South Canal	2,115	S-57	01/01 - 01/17		
5538 Rock Ditch	55	C-5	11/01 - 11/30		
5542 Bosgal	50	S-5	09/01 - 02/28		
5543 Waugh	200	S-10	12/16 - 02/28		
5544 Kelly	80	S-2	11/01 - 12/15		
5545 Henshaw	170	S-12	10/15 - 11/15		
5546 Waterdog Basin	400	C-35	03/20 - 10/30		
5547 Slagle Pass	310	C-30	07/28 - 09/27		
5548 Washboard Rock	760	S-34	05/16 - 09/15		
5549 High Park	1,660	S-60	07/01 - 09/30		
		H-1			
5551 Dexter Creek	65	H-3	06/01 - 06/21		
5561 East Fork	80	S-3	06/15 - 07/31		
		H-2	06/15 - 07/31		
			10/01 - 10/31		
5563 Moonshine Park	230	C-7	07/01 - 09/30		
5564 Gravel Pit	40	S-4	10/01 - 11/08		

TABLE 8-1
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND ALLOTMENTS (Cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (Cont.)					
5565 Tommy Creek	120	C-3	04/16 - 06/15		
5567 Busted Boiler	40	C-2	08/01 - 09/30		
5574 Tappan Creek	240	S-11	04/11 - 05/10 11/15 - 11/19		
		C-1,299			
		S- 337			
		H- 10			
SUBTOTALS	29,460	1,646			
		C-17,012			
		S-16,872			
		H- 36			
TOTALS	509,205	33,920			

TABLE 8-2
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING
PROGRAM: PROPOSED ELIMINATION OF GRAZING

Tract	Acres NRL	AUMs Eliminated
5037 Black Mesa	500	6
5552 Dallas	240	24
5553 Fisher Creek	480	34
5555 Taylor Draw	325	55
5556 Burro Creek	120	15
5557 Alkali	485	20
5559 South Fork	120	12
5560 Cookie Tree	640	55
5572 McKenzie Creek	110	5
TOTALS	3,020	226

TABLE 8-3
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM: SUMMARY OF PROPOSED RANGE IMPROVEMENTS

Range Improvements	Unit	Allotment Numbers a/ 5017	5020	5507	5508	5520	5522	Totals	Acres Disturbed per Unit b/ Short-term	Long-term	Total Acres Disturbed b/ Short-term	Long-term
WATER DEVELOPMENTS												
Wells	No.	-	-	2	-	2	3	7	0.2	0.2	1.4	1.4
Springs	No.	-	-	-	-	1	-	1	0.2	0.2	0.2	0.2
Reservoirs	No.	16	3	3	6	1	-	29	1.0	0.1	29.0	2.9
Pipelines	Mi.	-	6.0	22.0	-	2.0	7.5	37.5	0.2	-	7.5	-
Storage Tanks	No.	-	1	2	-	2	3	8	0.2	0.2	1.6	1.6
Water Troughs	No.	16	10	30	6	8	11	81	0.1	0.001	8.1	0.08
FENCES												
Fences	Mi.	5.5	7.0	18.0	5.0	-	-	35.5	1.0	0.002	35.5	0.07
Boundary Posts & Signs	No.	-	-	-	-	-	10	10	0.1	-	1.0	-
OTHER PROJECTS												
Cattleguards	No.	-	-	4	2	-	-	6	0.1	0.004	0.6	0.02
Stock Trails	Mi.	-	-	-	1.0	0.5	-	1.5	1.5	-	2.3	-
VEGETATION CONVERSIONS												
Chaining & Seeding	Ac.	505	800	-	-	670	150	2,125	1.0	-	2,125.0	-
Interseedings	Ac.	-	-	-	-	825	-	825	1.0	-	825.0	-
Countour Furrows	Ac.	-	-	-	-	430	-	430	0.05	-	21.5	-
TOTAL ACRES DISTURBED											3,058.7	6.27

a/ 5017 Green Mountain, 5020 Black Ridge, 5507 Pipeline, 5508 Government Springs, 5520 Lower Horsefly (X Lower Horsefly subunit), and 5522 Beaver Hill.
b/ Short-term means at least eight years from the present, which covers the period of implementation. Long-term means at least twenty years after full implementation or twenty-eight years from the present (i.e., 2006).

decrease in runoff and unquantifiable changes in sediment yield, as compared with not implementing a grazing plan. The magnitude of this decrease in sediment yield, as stated in the water resources section, could not be determined. The decrease in soil loss would have an impact upon the soil, but no data are available to substantiate changes that would take place.

In the water resources section of this chapter it is stated that the infiltration rates on the remaining allotments (elimination, custodial, etc.) would remain essentially unchanged. However, depending upon the increase, decrease, or no change in vegetation cover as shown by table 2-38 (see Vegetation), the runoff peak discharge and sediment yield would vary.

On those allotments (108,680 acres) on which there would be no change in runoff and sediment yield, there would be no increase in the soil loss and therefore no detectable change in the soil. The allotments (52,275 acres) on which there would be an increase in runoff and sediment yield would have soil losses; however, although the loss would cause changes in the soil, the magnitude or kind of changes cannot be predicted as there is no known methodology or data to substantiate changes. For allotments (247,575 acres) on which there would be a decrease in runoff and sediment yield, there would be a reduction in soil loss. As stated above, the reduction in soil loss would affect the soil, but the magnitude or kind of change cannot be predicted as there are no known data to substantiate any changes.

The changes in erosion condition class (shown in table 8-4) were derived by comparing changes in the soil surface factor that would occur with the implementation of only six AMPs. These changes were based on past experiences in similar situations. Under the present condition, 6 percent of the allotment acreage is in the stable erosion condition class; 45 percent is in the slight class; 43 percent is in the moderate class; 5 percent is in the critical class; and 1 percent is in the severe class. By 2006, 11 percent of the acres under the proposed action would be in the stable erosion condition class; 47 percent would be in the slight class; 37 percent would be in the moderate class; and 4 percent would be in the critical class; and 1 percent in the severe class. The net result would be a 4 percent increase in acres occurring in the stable erosion condition class; a 2 percent increase in acres in the slight class; a 5 percent decrease in acres in the moderate class; a 1 percent decrease in acres in the critical class; and no change in the severe class.

TABLE 8-4.—*Alternative A: Continuation of present grazing program, summary of changes in erosion condition classes*

	Erosion condition class				
	Stable	Slight	Moderate	Critical	Severe
Present acreage	32,260	236,998	224,767	28,320	3,430
Predicted acreage (by 2006)	55,165	248,330	197,105	21,755	3,430
Change	+22,905	+11,332	−27,662	−6,565	0

Water Resources

Assuming the vegetative densities increase as predicted, the gradual implementation of the six AMPs listed in table 8-1 would result in local decreases in runoff and sediment yield for large (50-year) storms. During normal years, there would be no detectable change. (Table 8-5 shows changes in runoff and peak discharge for the six allotments twenty years after implementation of AMPs.)

There would be no measurable changes in sediment loss for normal rainfall events on the six AMPs to be implemented. However, watershed impacts of grazing may show decreased sediment loss during larger storms. Changes in sediment yield cannot be quantified.

For the most part, infiltration rates on the remaining allotments (including those with elimination of grazing, custodial management, etc.) would remain essentially unchanged and vegetative densities would vary from allotment to allotment. Table 2-38 shows the predicted change in cover density for each vegetative type within each allotment (see Vegetation). With Gifford, Hawkins, and Williams' (1975) adaptation of the Soil Conservation Service (SCS) runoff curve number method, it was determined that for areas that show increased cover (52,275 acres), 10 to 40 percent decreases in runoff can be expected, depending on the amount of additional cover. For those areas with decreased cover predicted (247,575 acres), 10 to 50 percent increases in runoff can be expected. Areas with no predicted change in vegetative cover (108,680 acres) would have no change in runoff or sediment yield. Where there are increases in runoff, there would be increases in sediment yield and vice versa. Quantification of runoff and sediment yield can-

TABLE 8-5
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
HYDROLOGIC IMPACT ON THE SIX ALLOTMENTS WITH PROPOSED AMPs

Allotment Name & No.	Percent Change in Runoff	Percent Change in Peak Discharge
5017 Green Mountain	-80	-100
5020 Black Ridge	-80	-100
5507 Pipeline	-37	-60
5508 Government Springs	-40	-58
5520 Lower Horsefly	-27	-54
5522 Beaver Hill	-40	-58

Note: The above reductions in runoff and peak discharge were calculated by using the Gifford, Hawkins, and Williams (1975) method on a representative watershed basis. They are not absolute values but averages for the representative areas in which they are located.

not be done for individual allotments with existing data and methodologies.

Range improvements within each of the twelve allotments would have hydrologic impacts similar to the general impacts discussed in chapter 3. Table 8-6 outlines impacts on sediment yield specific to this alternative.

Vegetation

Table 8-7 shows the short-term impacts on vegetation by allotment and grazing system or season of use for allotments in the ES area. Under this alternative, long-term impacts of vegetative production, density, and key species composition would be the same as changes listed in table 2-38. Total vegetative production available for wildlife and livestock use by 2006 under this alternative would be 50,345 animal unit months (AUMs). For a summary of predicted range condition changes, see table 8-8. As table 8-8 shows, it is expected that there would be an increase in acres in good condition of 48,420 acres or an increase of 65 percent. Acres in fair condition would increase by 16,150 or 8 percent. Poor condition range would be decreased by 64,570 acres or 27 percent.

Improvements constructed for the six AMPs would initially disturb approximately 87 acres of vegetation and remove approximately 6 acres from permanent production (refer to table 8-3). An estimated 1 AUM of forage annually would no longer be available from these permanently disturbed acres.

In addition, there would be approximately 2,972 acres initially disturbed by vegetation manipulations, as shown by the acres disturbed columns in table 8-3. Although total acres on which impacts would occur from vegetation manipulations under this alternative would be significantly less than under the proposal, the same types of impact, such as increased production, vegetative density and key species composition, and changes in condition class, would occur as listed in chapter 3.

ENDANGERED PLANTS

The impacts to endangered plants under Alternative A would be the same as for the proposed action. They could be mitigated as shown in chapter 4.

Wildlife: Terrestrial

Two of the six AMPs to be implemented have been identified as being in deer crucial areas (5507 Pipeline, 5522 Beaver Hill). The rest are in deer wintering areas but not concentration or crucial areas.

Wildlife would benefit from AMP implementation as the competition decreases and vegetation increases. (Short-term impacts are identified in table 8-9.) Some small population increases could occur in the areas where AMP implementation occurs but, for the following reasons, these increases would be insignificant (less than 1 percent) when compared with the entire ES area. Browse condition is not expected to change from its present status (a conclusion reached in cooperation with the Colorado Division of Wildlife). According to observations by wildlife conservation officers (WCOs), BLM biologists, and Colorado Division of Wildlife (DOW) biologists, browse condition has not improved in the ES area in the past twenty years. In addition, the type of management in the future is not expected to be different from the management which resulted in the past and present browse condition. Therefore, wildlife population numbers are not expected to differ without the proposed action from what they are at the present time. In addition, factors outside the scope of this ES, namely subdivisions, harassment of animals, and other habitat losses, would limit the population growth.

Wildlife: Aquatic and Riparian

Seven of the already implemented AMPs have riparian and aquatic habitats: 4007 Sawmill Mesa (Cottonwood Creek), 4008 25 Mesa (Cottonwood Creek), 4012 Canal (Upper Roubideau Creek), 4502 Surface to Leroux (Currant Creek), 4503 Stingley Gulch (Leroux Creek), 4528 Oak Ridge (Minnesota Creek), and 5516 Piney (Dry Creek). The riparian vegetation in the following stream segments would reach the following future condition: Cottonwood-fair, Upper Roubideau-poor, Currant-good, Leroux-excellent, Minnesota-excellent, and Dry-poor. The impacts on these aquatic habitats are the same as with the proposed action, and they have been previously described by stream name in chapter 3.

Three of the six AMPs to be implemented under this alternative also have riparian communities and aquatic habitat: 5507 Pipeline (Dry Creek), 5520 Lower Horsefly (Dolores and Dry Cedar creeks), and 5522 Beaver Hill (Dolores, Happy Canyon, and Spring creeks). These riparian communities would reach the following condi-

TABLE 8-6
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
SHORT-TERM IMPACTS OF PROPOSED RANGE IMPROVEMENTS ON SEDIMENT YIELDS

Improvement	Acres Disturbed	Short-Term Increase/Decrease in Sediment Yields (tons)	Comments: Infiltration Rates	Comments: Runoff	Comments: Assumptions
Fences	35.5	+720.5			Calculations for all improvements except vegetative conversions assume: (1) uppermost limit of very high yield sediment class from Sediment Yield Map (Colo. Land Use Commission 1974), (2) sediment yield from disturbed areas of at least 3 acre feet per mile per year or 8 tons per acre per year, (3) equal rate of ground cover increases for 4 years, (4) 4 years to establish sufficient ground cover to stablize the area.
Boundary Markers	1.0	-			
Cattleguards	0.6	-			
Stock Trails	2.3	+46.0			
Pipelines	7.5	+150.0			
Wells	1.4	+28.0			
Storage Tanks	1.6	+29.0			
Reservoirs	29.0	+151.0			
Springs	0.2	+4.0			
Troughs	8.1	+162.0			
Vegetative Conversion:					
Chaining & Seeding	2,125.0	-	No change.	No increase from high-intensity storms.	
Interseeding	825.0	-	Little change.	Little change.	Negligible surface, soil disturbance.
Contour Furrows	21.5	-1,662.0	No effect on infiltration between furrow.	Reduce velocity of surface runoff. Store sediment yielded from between furrows.	Calculations use Universal Soil Loss Equation.
TOTALS	3,058.7	-371.5			

Note: Calculations use Universal Soil Loss Equation.

TABLE 8-7
ALTERNATIVE A: CONTINUATON OF PRESENT GRAZING PROGRAM:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE

Allotment No. & Name	Grazing Systems or Season of Use	Short-Terms Impacts a/
EXISTING OR PROPOSED AMPs 4006 Dry Mesa: A Escalante Subunit	Rest Rotation--Two Treatments (2,280 acres):	
	Utilize forage in fall or winter.	Litter accumulation reduced. Seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increase.
4503 Stingley Gulch 5521 Highway 90	Rest Rotation--Two Treatments (7,295 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Allows some seedling establishment.
4013 Ben Lowe 5020 Black Ridge 4528 Oak Ridge 5507 Pipeline	Rest Rotation--Three Treatments (55,980 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4012 Canal	Rest Rotation--Four Treatments (20,650 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.

a/ Short-term impacts would last one to three years.

TABLE 8-7
ALTERNATIVE A: CONTINUATON OF PRESENT GRAZING PROGRAM:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4006 Dry Mesa: B Dry Mesa Subunit 4537 Young's Peak Q Young's Peak Subunit	5508 Government Springs 5520 Lower Horsefly: X Lower Horsefly Subunit 5522 Beaver Hill	Rest Rotation--Four Treatments (46,145 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
		Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5516 Piney		Rest Rotation--Five Treatments (8,335 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
		Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
		Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
4502 Surface to Leroux 4529 Reynolds Creek 4530 McDonald Mesa 4549 Dry Creek		Deferred Rotation (10,725 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Defer grazing one growing season, and utilize forage in fall.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4007 Sawmill Mesa 4008 25 Mesa 5520 Lower Horsefly: Y Dry Cedar		Deferred (27,190):	
		Defer grazing during growing season, and utilize forage in fall or winter each year.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.

TABLE 8-7
ALTERNATIVE A: CONTINUATON OF PRESENT GRAZING PROGRAM:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name	Grazing Systems or Season of Use	Short-Terms Impacts a/
PROPOSED CONTINUATION OF PRESENT MANAGEMENT OR CUSTODIAL MANAGEMENT		
4006 Dry Mesa C Smith Ranch Subunit D Escalante Creek Subunit 4021 Point Creek 4501 Milk Creek 4513 Stevens Gulch 4519 Muddy Creek 4523 Williams Creek 4527 Jumbo Mountain 4536 West Young's Peak 4537 Young's Peak R Crawford Subunit 5002 Dedication Site 5011 Gould Reservoir 5012 Cedar Point 5013 Iron Canyon 5014 Poison Spring 5016 Black Canyon 5027 Adobe 5028 Doug Creek 5036 Big Gulch 5041 East Gould Reservoir 5043 Collins 5044 Big Pasture 5046 Big Gulch 5048 Morrow Point 5503 Green 5518 Dave Wood 5532 Burro Ridge 5535 Cedar Creek 5551 Dexter Creek 5566 Cow Creek 5570 Cedar	Spring Grazing (32,335 acres)	Vigor, reproduction, and litter accumulation reduced. Seed trample reduced.
4001 Dominguez 4005 Fall Cabin 4010 Monitor Mesa 4014 Joker 4015 White Ranch 4016 Wells Gulch 4017 Alkali Flats 4022 Petrie Mesa 4024 Dirty George 4025 Ward Creek-Doughspoon 4504 Leroux Creek 4506 Oak Mesa 4507 Jay Creek 4509 Upper Jay Creek 4511 Overland 4512 East Roatcap 4515 Freeman Gulch 4516 North Fork 4517 Coal Gulch 4518 Pilot Creek 4520 Spring Creek 4521 Stock Driveway 4522 Downing 4524 Deep Creek 4525 Anthracite Creek 4526 Crystal Creek 4531 Popp Ranch 4532 McDonald Ranch 4535 Home Place 4538 Missouri Flats 4539 Cottonwood Creek 4540 North Saddle Peak 4541 Sunshine Mesa 4543 South Saddle Peak 4548 Creek Bottom 5003 Selig Canal 5008 Brush Point 5010 Dead Horse 5015 Grizzly Gulch 5025 Fruitland Mesa 5029 Spring Gulch 5030 Bostwick Park 5033 Pinyon Springs 5038 Red Canyon 5039 Onion Valley 5040 Pine Ridge 5047 Mesa Creek 5049 Smith Fork 5050 Allen Reservoir 5509 Coal Creek 5510 Bald Hills 5514 East Fork Dry Creek 5515 Olathe Reservoir 5517 Spring Creek Canyon 5523 Horsefly 5524 Duckett Draw 5525 Dry Creek 5529 Log Hill 5530 Billy Creek 5540 Dry Gulch 5542 Bosgal 5546 Waterdog Basin 5547 Slagle Pass 5548 Washboard Rock 5549 High Park 5561 East Fork 5562 Hillside 5563 Moonshine Park 5565 Tommy Creek 5567 Busted Boiler 5568 Baldy 5569 Hairpin 5574 Tappan Creek	Spring and Fall or Season-long Grazing (270,960 acres)	Vigor, reproduction, and litter accumulation reduced. Seed trample reduced. (Some seed trample would occur.) Seedling establishment reduced.

TABLE 8-7
ALTERNATIVE A: CONTINUATON OF PRESENT GRAZING PROGRAM:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4002 Lower Escalante	5511 Shavano Mesa	Fall or Winter Grazing--Deferred Grazing (37,310 acres)	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4011 Lower Roubideau Canyon	5512 Franklin Mesa		
4026 Escalante Canyon	5513 Dry Creek Basin		
4514 Joker	5533 Onion Lakes		Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5022 Rabbit Gulch	5534 Shin Park		
5026 Star Nelson Airport	5536 South Canal		
	5538 Rock Ditch		
5045 Black Bullet	5543 Waugh		
5502 Sandy Wash	5544 Kelly		
5504 Roatcap	5545 Henshaw		
5505 Transfer	5564 Gravel Pit		
PROPOSED ELIMINATION OF GRAZING			
5037 Black Mesa	5556 Burro Creek	No Livestock Grazing (3,020 acres)	Vigor, reproduction, and litter accumulation increased. Seedling establishment allowed.
5552 Dallas	5557 Alkali		
5553 Fisher Creek	5559 South Fork		
5555 Taylor Draw	5560 Cookie Tree		
	5572 McKenzie Creek		

TABLE 8-8
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition (by 2006)			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
EXISTING AND PROPOSED AMPs							
4006 Dry Mesa:							
A Escalante Subunit							2,280
Saltbush	-	1,480	-	1,480	-	-	
Sagebrush	-	120	680	120	680	-	
B Dry Mesa Subunit							16,165
Pinyon-Juniper	1,235	6,725	-	4,595	3,365	-	
Saltbush	-	1,680	-	1,680	-	-	
Sagebrush	4,205	2,320	-	6,525	-	-	
4007 Sawmill Mesa							12,095
Pinyon-Juniper	1,080	3,040	6,935	2,600	8,455	-	
Saltbush	-	800	-	800	-	-	
Sagebrush	-	-	240	-	240	-	
4008 25 Mesa							10,405
Pinyon-Juniper	-	-	7,565	-	7,565	-	
Saltbush	-	2,320	-	2,320	-	-	
Broadleaf Trees	360	160	-	520	-	-	
4012 Canal							10,650
Pinyon-Juniper	-	1,600	2,690	800	3,490	-	
Saltbush	-	-	6,360	-	6,360	-	
4013 Ben Lowe							5,490
Pinyon-Juniper	-	1,515	240	755	1,000	-	
Saltbush	-	-	2,855	-	2,855	-	
Sagebrush	-	880	-	880	-	-	
4502 Surface to Leroux							3,230
Pinyon-Juniper	60	1,590	-	855	795	-	
Mountain Shrub	1,580	-	-	1,580	-	-	
4503 Stingley Gulch							1,080
Pinyon-Juniper	-	930	-	465	465	-	
Mountain Shrub	-	150	-	150	-	-	
4528 Oak Ridge							3,600
Pinyon-Juniper	-	230	-	115	115	-	
Mountain Shrub	390	2,905	-	3,295	-	-	
Sagebrush	-	75	-	75	-	-	
4529 Reynolds Creek							1,200
Pinyon-Juniper	45	175	-	130	90	-	
Mountain Shrub	620	-	-	620	-	-	
Sagebrush	-	360	-	360	-	-	
4530 McDonald Mesa							3,185
Pinyon-Juniper	-	1,945	-	970	975	-	
Saltbush	-	-	880	-	880	-	
Sagebrush	-	360	-	360	-	-	
4537 Young's Peak:							
Q Young's Peak Subunit							2,260
Pinyon-Juniper	-	2,260	-	1,130	1,130	-	
4549 Dry Creek							3,110
Pinyon-Juniper	-	1,540	-	770	770	-	
Mountain Shrub	360	1,210	-	1,570	-	-	
5017 Green Mountain							20,825
Pinyon-Juniper	1,530	4,195	4,610	4,130	6,205	-	
Mountain Shrub	4,830	-	-	4,830	-	-	
Sagebrush	630	4,440	590	5,070	590	-	
5020 Black Ridge							6,875
Pinyon-Juniper	-	845	4,790	1,220	4,415	-	
Sagebrush	-	1,240	-	1,240	-	-	
5507 Pipeline							19,190
Pinyon-Juniper	6,520	5,125	7,305	9,080	9,870	-	
Halfshrub	240	-	-	240	-	-	

TABLE 8-8
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE (cont.)

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition (by 2006)			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
5508 Government Springs							2,260
Pinyon-Juniper	580	890	790	1,025	1,235	-	
5516 Piney							8,335
Mountain Shrub	-	2,195	900	2,195	900	-	
Sagebrush	-	-	5,240	-	5,240	-	
5520 Lower Horsefly:							
X Lower Horsefly Subunit							5,675
Pinyon-Juniper	480	2,430	1,180	2,365	1,725	-	
Saltbush	-	-	680	-	680	-	
Sagebrush	-	220	685	220	685	-	
Y Dry Cedar Subunit							4,690
Pinyon-Juniper	-	-	540	270	270	-	
Saltbush	4,150	-	-	4,150	-	-	
5521 Highway 90							6,215
Pinyon-Juniper	860	3,800	1,555	2,760	3,455	-	
5522 Beaver Hill							19,785
Pinyon-Juniper	5,100	7,425	7,260	8,960	10,825	-	
SUBTOTALS	34,855	69,175	64,570	83,275	85,325	0	168,600
OTHER NRL	40,135	146,255	170,785	40,135	146,255	170,785	357,175
TOTALS	74,990	215,430	235,355	123,410	231,580	170,785	525,775
SUMMARY OF CHANGES				+48,420 +65%	+16,150 +8%	-64,570 -27%	

TABLE 8-9
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE

Allotment No. & Name		Grazing Systems or Season of Use	Short-Term Impacts a/
EXISTING OR PROPOSED AMPs			
4006 Dry Mesa: A Escalante Subunit		Rest Rotation (Two Treatments):	
		Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially between between sheep and deer.
		Rest from grazing yearlong.	All forage available for wildlife.
4503 Stingley Gulch 5521 Highway 90		Rest Rotation (Two Treatments):	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Rest from grazing yearlong.	All forage available for wildlife.
4013 Ben Lowe 4528 Oak Ridge 5017 Green Mountain	5020 Black Ridge 5507 Pipeline	Rest Rotation (Three Treatments):	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially sheep and deer, and between sheep and antelope.
		Rest from grazing yearlong.	All forage available for wildlife.
4012 Canal		Rest Rotation (Four Treatments):	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Utilize forage in summer.	Reduced winter forage.
		Utilize forage in fall.	Reduced winter forage.
		Rest from grazing yearlong.	All forage available for wildlife.

Note: This table should be reviewed in conjunction with table 8-7. Impacts of grazing management on browse species were considered in that table while this table deals with impacts on wildlife species.
a/ Short-term impacts on wildlife would last one to three years.

TABLE 8-9
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Term Impacts a/
4006 Dry Mesa B Dry Mesa Subunit 4537 Young's Peak Q Young's Peak Subunit	5508 Government Springs 5520 Lower Horsefly: X Lower Horsefly Subunit 5522 Beaver Hill	Rest Rotation (Four Treatments):	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Utilize forage in fall.	Reduced winter forage.
		Rest from grazing yearlong.	All forage available for wildlife.
		Utilize forage in fall or winter.	Reduced winter forage; competition with livestock, especially between sheep and deer, and between sheep and antelope.
5516 Piney		Rest Rotation (Five Treatments):	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Utilize forage in summer.	Reduced winter forage.
		Utilize forage in fall.	Reduced winter forage.
		Rest from grazing yearlong.	All forage available for wildlife.
		Utilize forage in summer.	Reduced winter forage.
4502 Surface to Leroux 4529 Reynolds Creek 4530 McDonald Mesa 4549 Dry Creek		Deferred Rotation:	
		Utilize forage in spring.	Competition between all grazing species and livestock.
		Defer grazing one growing season, and utilize forage in fall.	Defer: Forage available for wildlife. Graze: Reduced winter forage.
4007 Sawmill Mesa 4008 25 Mesa	5520 Lower Horsefly: Y Dry Cedar	Deferred:	
		Defer grazing during growing season, and utilize forage fall or winter each year.	Defer: Forage available for wildlife. Graze: Reduced winter forage; competition between species, especially between sheep and deer.

TABLE 8-9
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name	Grazing Systems or Season of Use	Short-Terms Impacts a/
PROPOSED CONTINUATION OF PRESENT MANAGEMENT OR CUSTODIAL MANAGEMENT		
4006 Dry Mesa C Smith Ranch Subunit D Escalante Creek Subunit 4021 Point Creek 4501 Milk Creek 4513 Stevens Gulch 4519 Muddy Creek 4523 Williams Creek 4527 Jumbo Mountain 4536 West Young's Peak 4537 Young's Peak R Crawford Subunit 5002 Dedication Site 5011 Gould Reservoir 5012 Cedar Point 5013 Iron Canyon 5014 Poison Spring 5016 Black Canyon 5027 Adobe 5028 Doug Creek 5036 Big Gulch 5041 East Gould Reservoir 5043 Collins 5044 Big Pasture 5046 Big Gulch 5048 Morrow Point 5503 Green 5518 Dave Wood 5532 Burro Ridge 5535 Cedar Creek 5551 Dexter Creek 5566 Cow Creek 5570 Cedar	Spring Grazing	Competition between all grazing wildlife species and livestock.
4001 Dominguez 4005 Fall Cabin 4010 Monitor Mesa 4014 Joker 4015 White Ranch 4016 Wells Gulch 4017 Alkali Flats 4022 Petrie Mesa 4024 Dirty George 4025 Ward Creek-Doughspoon 4504 Leroux Creek 4506 Oak Mesa 4507 Jay Creek 4509 Upper Jay Creek 4511 Overland 4512 East Roatcap 4515 Freeman Gulch 4516 North Fork 4517 Coal Gulch 4518 Pilot Creek 4520 Spring Creek 4521 Stock Driveway 4522 Downing 4524 Deep Creek 4525 Anthracite Creek 4526 Crystal Creek 4531 Popp Ranch 4532 McDonald Ranch 4535 Home Place 4538 Missouri Flats 4539 Cottonwood Creek 4540 North Saddle Peak 4541 Sunshine Mesa 4543 South Saddle Peak 4548 Creek Bottom 5003 Selig Canal 5008 Brush Point 5010 Dead Horse 5015 Grizzly Gulch 5025 Fruitland Mesa 5029 Spring Gulch 5030 Bostwick Park 5033 Pinyon Springs 5038 Red Canyon 5030 Onion Valley 5040 Pine Ridge 5047 Mesa Creek 5049 Smith Fork 5050 Allen Reservoir 5509 Coal Creek 5510 Bald Hills 5514 East Fork Dry Creek 5515 Olathe Reservoir 5517 Spring Creek Canyon 5523 Horsefly 5524 Duckett Draw 5525 Dry Creek 5529 Log Hill 5530 Billy Creek 5540 Dry Gulch 5542 Bosgal 5546 Waterdog Basin 5547 Slagle Pass 5548 Washboard Rock 5549 High Park 5561 East Fork 5562 Hillside 5563 Moonshine Park 5565 Tommy Creek 5567 Busted Boiler 5568 Baldy 5569 Hairpin 5574 Tappan Creek	Spring and Fall or Season-long Grazing	Competition between all grazing wildlife species and livestock. Reduced winter forage for wildlife.

TABLE 8-9
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PREDICTED SHORT-TERM IMPACTS ON WILDLIFE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4002 Lower Escalante	5511 Shavano Mesa	Fall or Winter (Deferred Grazing)	Defer: All forage in spring available for wildlife. Reduced winter forage, competition between species, especially between sheep and deer, and between sheep and antelope.
4011 Lower Roubideau Canyon	5512 Franklin Mesa		
4026 Escalante Canyon	5513 Dry Creek Basin		
4514 Joker	5533 Onion Lakes		
5022 Rabbit Gulch	5534 Shin Park		
5026 Star Nelson Airport	5536 South Canal		
5045 Black Bullet	5538 Rock Ditch		
5502 Sandy Wash	5543 Waugh		
5504 Roatcap	5544 Kelly		
5505 Transfer	5545 Henshaw		
	5564 Gravel Pit		
PROPOSED ELIMINATION OF GRAZING			
5037 Black Mesa	5556 Burro Creek	No Livestock Grazing	All forage available for wildlife.
5552 Dallas	5557 Alkali		
5553 Fisher Creek	5559 South Fork		
5555 Taylor Draw	5560 Cookie Tree		
	5572 McKenzie Creek		

tions by 2006: Dry-good, Dolores-excellent, Happy Canyon-excellent, and Spring-excellent. The impacts on these aquatic communities are the same as with the proposed action, and these have been discussed by stream name in chapter 3.

In allotments where AMPs are not implemented, riparian areas would remain the same or decline to conditions shown by allotment in table 2-39.

Overall as result of implementing this alternative, riparian habitats in excellent condition would increase 3.4 miles to 15.8 total miles, habitats in good condition would decrease 23.6 miles to 21.8 total miles, habitats in fair condition would increase 10.3 miles to 71.1 miles total, habitats in poor condition would show a net increase of 3.5 miles to a total of 34.2 miles, and stream areas with nonexistent riparian habitat would increase 6.4 miles to 19.9 miles.

In the total twenty allotments where AMPs are implemented under this alternative, some unquantifiable improvement in sediment yield and turbidity in adjacent waterways can be expected, but this would be less than with the proposed action. Insignificant improvements in the survival and numbers of aquatic organisms would result.

No improvement in aquatic habitat would be expected for allotments without AMPs. There would be no improvement in the abundance of aquatic organisms, and any streams where riparian habitat declined would show a corresponding decline in aquatic habitat.

Cultural Resources

A continuation of present management could result in adverse impacts to cultural resources through negligence. Some benefits to cultural resources could be derived through mitigation of implementing actions. Mitigation would be accomplished via compliance procedures as established in 36 CFR Part 800 and outlined in chapter 4.

Recreation

With the exception of hunting, the impacts in recreation described for the proposed action would also occur if this alternative is implemented. However, because vegetative improvements would be less than under the proposed action, it follows that net wildlife populations would remain about the same (see Wildlife). Under this alternative, hunter success ratios likely would decrease, with the projected increase in hunters and game numbers staying at about the same level; however, this decrease would not affect demand.

Agriculture: Livestock Grazing

Under this alternative there would be a short-term reduction in present active licensed use of 1,449 AUMs (35,369 - 33,920 = 1,449). Annual livestock use by 2006 under this alternative would be 1,067 AUMs less than the present active licensed use (35,369 - 34,302 = 1,067) (table 8-10). While AUM use would be expected to increase from 11,066 AUMs to 11,494 AUMs by 2006 on the twenty AMP allotments, use would be reduced as production levels decrease on the rest of the allotments.

Socio-Economic Conditions

POPULATION

On-going population trends would not be influenced.

INCOME

ES area incomes would remain relatively unaffected with the exception of range livestock-related income which would decrease.

Active licensed use would decrease to 33,920 AUMs immediately upon initiation of this alternative which would be a 1,449 AUM reduction from the 1975 level of 35,369 AUMs and result in a reduction (1970 dollars) in direct livestock-related income of $4,202.10 (1,449 x $2.90 = $4,202.10). Total direct and indirect livestock related income would decrease by $6,248.52 from the 1975 level ($4,202.10 x 1.487 = $6,248.52).

By the year 2006 it is expected that active licensed use would increase to 34,302 AUMs, which would amount to a long-term decrease of 1,067 AUMs from the 1975 level. Thus, the long-term decrease in direct livestock-related income would be $3,094.30 (1,067 x $2.90 = $3,094.30), and direct and indirect range livestock-related income would decrease by $4,601.22 ($3,094.30 x 1.487 = $4,601.22).

EMPLOYMENT

ES area employment is not expected to change as a result of adopting this alternative.

SOCIAL WELL-BEING

The area populace would experience no change in social well-being with the exception of a few area livestock operators who would experience a slight loss of income.

TABLE 8-10
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
4001 Dominguez	5,600	1,833	1,833	4,320	1,833
4002 Lower Escalante	335	300	300	280	280
4005 Fall Cabin	40	18	18	40	18
4006 Dry Mesa	1,185	883	665	1,585	876
4007 Sawmill Mesa	790	536	341	1,210	600
4008 25 Mesa	810	644	773	985	644
4010 Monitor Mesa	1,435	1,174	1,174	1,300	1,173
4011 Lower Roubideau Canyon	45	89	27	10	10
4012 Canal	1,000	831	831	1,220	822
4013 Ben Lowe	570	446	446	755	432
4014 Joker	115	87	87	150	87
5015 White Ranch	25	10	10	35	10
4016 Wells Gulch	2,680	2,380	2,380	2,680	2,366
4017 Alkali Flats	3,560	2,651	2,651	2,780	2,651
4021 Point Creek	115	0	101	95	77
4022 Petrie Mesa	1,430	1,258	1,258	1,090	1,258
4024 Dirty George	300	236	236	200	200
4025 Ward Creek-Doughspoon	700	441	441	650	441
4026 Escalante Canyon	40	20	20	40	20
4501 Milk Creek	15	16	16	15	15
4502 Surface to Leroux Creek	495	443	443	655	418
4503 Stingley Gulch	125	98	98	150	98
4504 Leroux Creek	195	249	190	140	140
4505 Juniper Knob	10	None	10	10	4
4506 Oak Mesa	95	64	64	80	64
4507 Jay Creek	1,030	879	879	800	800
4509 Upper Jay Creek	75	94	66	50	50
4511 Overland	20	29	14	20	14
4512 East Roatcap	10	68	10	10	10
4513 Stevens Gulch	865	694	694	650	650
4514 Upper Terror Creek	5	17	3	5	3
4515 Freeman Gulch	70	53	53	70	53
4516 North Fork	2,630	1,079	1,079	2,165	1,079
4517 Coal Gulch	770	484	484	595	484
4518 Pilot Creek	40	38	33	40	33
4519 Muddy Creek	25	16	16	25	16
4520 Spring Creek	30	26	25	30	26
4521 Stock Driveway	10	6	6	10	5
4522 Downing	30	22	24	30	22
4523 Williams Creek	10	8	8	10	8
4524 Deep Creek	10	3	3	10	3
4525 Anthracite Creek	170	118	118	125	117
4526 Crystal Creek	60	51	51	60	50
4527 Jumbo Mountain	700	413	413	555	413
4528 Oak Ridge	335	210	238	400	244
4529 Reynolds Creek	190	158	158	210	159
4530 McDonald Mesa	205	100	122	310	122
4531 Popp Ranch	15	8	4	15	4
4532 McDonald Ranch	725	536	536	585	536
4535 Home Place	15	15	15	15	15
4536 West Young's Peak	10	6	6	10	6
4537 Young's Peak	240	171	113	280	175
4538 Missouri Flats	5	4	4	5	4
4539 Cottonwood Creek	10	10	8	10	10
4540 North Saddle Peak	40	31	31	30	30
4541 Sunshine Mesa	5	5	5	0	0
4543 South Saddle Peak	20	13	13	20	13
4548 Creek Bottom	10	5	5	10	5
4549 Dry Creek	265	135	193	410	183
5002 Dedication Site	100	213	44	100	44
5003 Selig Canal	725	330	330	635	330

TABLE 8-10
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)(Cont.)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
5008 Brush Point	1,755	1,123	1,123	1,450	1,123
5010 Dead Horse	200	171	171	135	135
5011 Gould Reservoir	390	305	305	315	305
5012 Cedar Point	80	55	55	70	55
5013 Iron Canyon	135	95	95	110	95
5014 Poison Spring	145	99	99	145	99
5015 Grizzly Gulch	260	349	230	260	230
5016 Black Canyon	45	82	45	45	45
5017 Green Mountain	2,825	1,647	1,660	3,725	1,660
5020 Black Ridge	605	400	400	765	400
5022 Rabbit Gulch	70	35	35	70	35
5025 Fruitland Mesa	5	2	2	5	2
5026 Star Nelson Airport	5	11	5	5	5
5027 Adobe	30	24	24	30	24
5028 Doug Creek	70	60	60	65	60
5029 Spring Gulch	150	110	110	140	110
5030 Bostwick Park	380	188	188	350	188
5033 Pinyon Springs	160	132	131	160	131
5036 Big Gulch	5	5	5	5	5
5037 Black Mesa	0	6	0	0	0
5038 Red Canyon	5	3	3	5	2
5039 Onion Valley	20	17	17	20	17
5040 Pine Ridge	15	14	14	15	14
5041 East Gould Reservoir	40	20	20	35	20
5043 Collins	15	10	10	15	10
5044 Big Pasture	20	15	15	20	15
5045 Black Bullet	5	3	3	5	3
5046 Big Gulch	35	0	35	35	35
5047 Mesa Creek	75	23	55	75	23
5048 Morrow Point	40	8	8	40	8
5049 Smith Fork	30	19	19	25	19
5050 Allen Reservoir	30	23	24	30	23
5502 Sandy Wash	940	707	707	805	707
5503 Green	50	39	39	40	39
5504 Roatcap	350	264	264	280	264
5505 Transfer	300	214	214	205	205
5507 Pipeline	2,270	1,715	1,560	2,890	1,973
5508 Government Springs	180	125	83	225	125
5509 Coal Creek	50	44	44	50	44
5510 Bald Hills	25	21	21	25	21
5511 Shavano Mesa	200	261	200	140	140
5512 Franklin Mesa	355	363	350	335	335
5513 Dry Creek Basin	410	440	300	395	300
5514 East Fork Dry Creek	15	11	11	15	11
5515 Olathe Reservoir	15	18	17	15	15
5516 Piney	800	557	557	1,110	557
5517 Spring Creek Canyon	35	52	35	35	35
5518 Dave Wood	215	176	176	195	176
5520 Lower Horsefly	965	665	664	1,105	667
5521 Highway 90	445	265	265	685	313
5522 Beaver Hill	1,570	1,022	934	1,875	1,026
5523 Horsefly	55	38	38	40	37
5524 Ducket Draw	15	20	6	15	5
5525 Dry Creek	15	15	9	15	15
5529 Log Hill	310	189	189	235	189
5530 Billy Creek	265	150	150	240	150
5532 Burro Ridge	20	15	15	15	15

TABLE 8-10
ALTERNATIVE A: CONTINUATION OF PRESENT GRAZING PROGRAM:
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)(Cont.)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
5533 Onion Lakes	35	15	15	35	15
5534 Shin Park	300	251	251	185	185
5535 Cedar Creek	10	6	6	10	6
5536 South Canal	120	60	57	120	57
5538 Rock Ditch	5	9	5	5	5
5540 Dry Gulch	930	808	808	900	797
5542 Bosgal	5	9	5	5	5
5543 Waugh	10	30	10	10	10
5544 Kelly	5	2	2	5	2
5545 Henshaw	15	12	12	15	12
5546 Waterdog Basin	45	35	35	40	34
5547 Slagle Pass	40	30	30	40	30
5548 Washboard Rock	55	34	34	55	34
5549 High Park	110	61	61	110	61
5551 Dexter Creek	5	3	3	5	3
5552 Dallas	15	24	0	15	0
5553 Fisher Creek	40	34	0	35	0
5555 Taylor Draw	25	55	0	25	0
5556 Burro Creek	10	15	0	10	0
5557 Alkali	40	20	0	35	0
5559 South Fork	15	12	0	15	0
5560 Cookie Tree	50	57	0	45	0
5561 East Fork	5	14	5	5	5
5562 Hillside	10	40	10	10	10
5563 Moonshine Park	10	7	7	10	7
5564 Gravel Pit	5	4	4	5	4
5565 Tommy Creek	20	18	3	20	18
5566 Cow Creek	105	70	70	105	70
5567 Busted Boiler	5	2	2	5	2
5568 Baldy	135	88	88	135	88
5569 Hairpin	30	18	18	25	18
5570 Cedar	375	315	315	340	315
5572 McKenzie Creek	10	5	0	10	0
5574 Tappan Creek	20	11	11	20	11
TOTALS	51,315	35,369	33,920	50,345	34,302

PUBLIC FINANCE AND TAX BASE

Allowable livestock use (active use qualifications) would be reduced from the present level of 40,705 AUMs to 40,479 AUMs when this alternative is initiated which would lead to a slight reduction in the ES area tax base. This reduction of 226 AUMs of allowable use (from elimination of grazing on nine allotments; see table 8-2) would reduce the carrying capacity of area ranches by 18.83 animal units which would reduce the paper value of area ranches affected by this allowable reduction by about $18,830. Since Colorado properties are assessed at about 30 percent of market value, this reduction in ranch value would amount to a $5,649 reduction in the area tax base. This tax base reduction would be 0.007 percent of the 1975 ES area assessed valuation (Colorado Department of Local Affairs 1975).

It should be noted that Colorado agricultural land prices reflect demand influences for land for considerations other than future ranch income. Therefore, the likelihood that ES area ranch property would appreciate in value is acknowledged. However, values of ranch property with decreased present value as a result of adopting this alternative might be expected to increase at a slower rate than those similar properties experiencing no decreased carrying capacity. Impact of this decreased carrying capacity would have to be assessed on an individual operator-by-operator basis.

SOCIO-CULTURAL ATTITUDES

ES area values and attitudes would undergo no appreciable change.

ALTERNATIVE B: ELIMINATION OF LIVESTOCK GRAZING

Description

Alternative B would eliminate domestic livestock grazing on NRL in the ES area (35,369 AUMs). Trespass control would be enforced through extensive boundary fencing and through inspection. Approximately 1,012 miles of fencing would be required to separate NRL from state and private lands, and a fence maintenance crew would be required year-round. In addition, two or three on-ground and aerial trespass inspectors would be needed. Construction of 1,012 miles of fence would cost approximately $2,428,800. Maintenance costs would be approximately $48,575 per year.

Some private landowners might close their lands to the public, which could limit public access to NRL.

Analysis

Soils

The water resources section states that with the elimination of grazing there would be anticipated increases in soil infiltration rates, reductions in runoff, and decreases in sediment yield. With these changes there would be a reduction in soil loss and as a result there would be changes in the soil. However, as previously stated in this chapter, the magnitude or kinds of changes cannot be substantiated since there is no known methodology or data to substantiate changes which will take place.

Water Resources

Elimination of grazing would have the following impacts on hydrologic processes and factors on all pastures in the ES area: (1) precipitation would be detained longer by improved plant cover; (2) evaporative losses, although slight, would increase proportionately with plant cover; (3) infiltration rates would slowly approach those characteristic of the soil type without grazing use; (4) overland flow velocities and quantities would be reduced, especially those associated with moderate to heavy rainfall; (5) storm runoff volumes and peak discharge would be lowered; (6) channel stability would improve as scour and bank erosion decrease in frequency and magnitude; (7) the soil water deficit, or the difference between the moisture needed as compared with the moisture available for plant use, would be reduced, and more soil moisture would become available for plant transpiration; (8) sediment discharges should decrease, as should potential maximum sediment transport capacities; (9) year-to-year climatic fluctuations would begin to exert less and less control over the water yield of subject allotments; and (10) runoff would decrease over the long term. Several of the above impacts could take two to five years to become evident or measurable. Although these impacts can be predicted, the amount of change is quite variable and cannot be predicted.

Vegetation

As stated in the chapter 3 vegetation section, the recovery time for range condition in the ES area is much greater, due to precipitation dif-

ferences, than in the area of the cited study (McLean and Tisdale 1972). Therefore, the assumption made in chapter 3 that allotments with proposed elimination of grazing would require over 40 years to recover to good range conditions could be applied to all of the ES area. Thus, by 2006, range condition, vegetative density, and key species composition would not change significantly (greater than 2 percent) under this alternative. Vegetative production would remain at or about 51,315 AUMs annually; range condition would remain at or about 74,990 acres in good, 215,430 acres in fair, and 235,355 acres in poor condition. (Refer to tables 2-10 and 2-11).

Construction of 1,012 miles of boundary fence necessary to implement this alternative would temporarily remove 1,012 acres from production and permanently remove 2 acres.

ENDANGERED PLANTS

The dangers to *Sclerocactus glaucus* and *Echinocereus triglochidiatus* var. *inermis* from being trampled and possibly eaten by grazing animals would be reduced as livestock were taken off the ES area. *Penstemon retrorsus* and *Mimulus eastwoodiae* would not be affected by this alternative.

Wildlife: Terrestrial

Under this alternative, competition with livestock would be eliminated and all 35,369 AUMs would be available for wildlife. However, studies indicate that livestock grazing improves elk habitat (Anderson and Scherzinger 1975), reduces fire danger (Hill 1956), and creates a favorable balance between shrubs and grasses (Einarsen 1948). Tueller and Monroe (no date) studying game ranges in Nevada concluded that "It would be irresponsible to recommend complete cessation of livestock grazing on these ranges, both because of economic reasons and because a certain amount of use by cattle and horses encourages browse reproduction by reducing competing grasses for forbs." (The studies and conclusions presented here and in the following discussions reflect primary principles of game management developed through years of research. Because they are general principles, they are applicable anywhere they are applied, including the ES area.)

Mule deer, elk, and antelope are successional species that do best in areas where subclimax vegetation stages are maintained by grazing, logging, fire, or other disturbance (Taylor 1956; Dasmann 1964; Leopold 1966; Tueller and Monroe, no date; and U.S. Department of the Interior 1974). Short-term increases in some populations would occur as a result of this alternative, but long-term increases could not be expected.

The short-term population increases would be a result of the increased AUMs available for wildlife use. Not all of these AUMs would be used by wildlife due, in part, to the diets of the respective species. However, deer and elk use would increase as livestock grazing is eliminated (U.S. Department of Agriculture, no date), and with more AUMs (more food) available more animals would be produced initially.

If the DOW does not expand hunting seasons or bag limits, the following long-term impacts can be expected. As vegetation increases due to elimination of grazing, the wildlife populations, principally the big game species that are not as responsive to habitat changes as small game species, would continue to increase above the carrying capacity of the range. As the animals increase, the amount of food, the quality of that food, and the vigor of the plants would be reduced (see Vegetation in chapter 3). As the food species decrease the number of animals would begin to decrease and, if damage has been done to the habitat, severe biological repercussions could occur in the form of massive die-offs of animals (Errington 1956). The habitat could then be so far down that even removal of the wildlife species would not allow the range to recover to a suitable status for rehabitation by these species (Dasmann, 1964).

However, if the DOW does expand hunting seasons or bag limits, then the following long-term impacts can be expected. With such control exerted on the wildlife species, the populations could be held within the carrying capacity of the habitat. Population increases would then be similar to those under the proposed action, since the proposed action included the assumption that the proposed percentage increase in wildlife populations would contain the population within the carrying capacity. However, as the vegetation species slowly move toward the climax stage, the wildlife species that are dependent upon subclimax stages would begin to decrease. Succession could take more than the twenty years of the long term, but some slight changes might become evident by 2006.

In addition vegetation manipulation and range improvements would not be implemented under this alternative, unless funded, supervised, and done by wildlife personnel. With current personnel and funding levels, this would not occur.

Without the projects, improvements, and livestock grazing, it could be expected that wildlife population in the next twenty years would remain the same, with a possibility of some decrease. Species composition could change during this time, depending upon the number of species currently in an area. For example, say that the deer on an allotment outnumber elk by 3 to 1. As the deer eat more shrubs and browse, grass species would increase, thus triggering a decrease in deer numbers and an eventual increase in elk until a ratio of 1 to 3 may be reached. A cycle could then develop until the deer and elk numbers are fluctuating around a 1 to 1 ratio. However, a static situation would not develop since there are other outside factors which also affect composition, such as human activities, decreased habitat, the secretiveness of some species, and the amount of hunter pressure.

PRAIRIE DOGS

Prairie dog towns have been found to disappear after cattle use of an area has been eliminated (Koford 1958). This appears to be due to the encroachment of tall grass and forbs; the prairie dogs cannot see over them and thus are more subject to predation. The disappearance occurs within ten years of cessation of grazing. In the ES area such disappearance could occur but, due to the different vegetation types associated with the prairie dog towns, it would take longer than ten years.

BIRDS

Studies comparing effects of grazing and no grazing on bird populations in open rangelands are lacking (Weins and Dyer 1975). However, in a comparison study on the open grasslands of Colorado, more breeding species appeared to be present on ungrazed or lightly grazed sites. On two sites, total density and standing crop biomass were greater in lightly grazed plots than on ungrazed plots (Weins and Dyer 1975).

This study is difficult to apply to the ES area due to the nature of the study area. However, as grazing modifies the vegetative composition of an area, more diversity within that type would occur; and, the more diverse an area is, the more complex it becomes, allowing more species to be present. Areas with different habitat types have more diversity of breeding species than large monotypic habitat types (Weins and Dyer 1975). This diversity increases to a point where, as the habitat blocks decrease, the breeding density also decreases. Nevertheless, because of the large amount of acreage involved in the ES area and the lack of major changes in vegetative types, a decrease in breeding species is not expected to occur in the ES area.

Wildlife: Aquatic and Riparian

Riparian and aquatic communities on NRL would return to their natural condition by 2006. Vegetation consisting of riparian species would increase and reestablish in most areas. Riparian habitats in excellent condition would increase to 57.8 miles, and riparian habitats in good condition would increase to 60.8 total miles. Riparian habitats in fair condition would decrease to 30.7 total miles, habitats in poor condition would decrease to 2.1 total miles, and 11.4 miles of stream bottom would not support riparian vegetation due to lack of water.

Decreased stream bank erosion would result in channel morphologies more suitable to fish (Gunderson 1968). As watershed condition improves, stream waters would carry 5 to 10 percent less sediment and turbidity would decrease. Overhanging vegetation would lower water temperatures, and trout would be able to survive at lower elevations on NRL. After spring runoff flushes accumulated sediments from stream bed gravels, spawning may be possible in streams that historically supported fish populations before being exposed to heavy sediment loads. Increased abundances of terrestrial insects would be available in riparian vegetation, and the abundances and diversity of aquatic organisms would increase as new niches become available.

Sediment and turbidity carried in the Uncompahgre, North Fork, and Gunnison rivers would decrease and these waters would become more suitable for clean water organisms. Aquatic invertebrates characteristic of clean water would increase and the number and condition of trout in suitable areas would increase slightly.

Grouse, wild turkey, chukar partridge, quail, and rabbits, as well as furbearers like beaver and muskrat, would increase in number with improved riparian habitats.

Cultural Resources

Implementation of Alternative B would result in a significant decrease in adverse impacts to cultural resources. The resource base would no longer be subject to disturbance from livestock grazing and related activities. Stabilized soil conditions in revegetated areas would reduce adverse impacts to cultural properties.

Some disturbance to cultural sites could occur as a result of fencing and other related activities on NRL to prevent livestock trespass. The 1,012 miles of proposed fencing would disturb 1,012 acres of NRL, but compliance procedures as outlined in chapter 4 would be followed to mitigate potential impacts.

Recreation

This alternative could result in a more flexible recreation resource capability; however, existing and anticipated use levels would not change appreciably. Any loss of quasi-public access (to facilitate livestock operations) would likewise be minimal.

Agriculture: Livestock Grazing

As a result of elimination of grazing on NRL within the ES area, domestic livestock use totaling approximately 35,369 AUMs (1975 active licensed use) per year would be lost. This loss would amount to about 2,947 animal units of reduction in area operators herds (35,369 ÷ 12 = 2,947.42) and would be about 2.3 percent of the 1974 ES area livestock inventory.

The 146 operators presently using NRL for grazing have the following dependency on BLM (by AUM comparison): 50 operators, less than 3 percent; 78 operators, 3 to 15 percent; 7 operators, 16 to 25 percent; and 11 operators, above 25 percent (BLM, Range Automated Data Processing System 1977). This dependency factor is critical to the existence of the livestock operations in question to varying degrees depending upon debt burden, level of capitalization, present net income, diversification of operation, operator's age, scale of operation, and proximity to and availability of alternative forage sources. Since information is lacking on individual operators, it is not possible to determine with certainty how many operators would remain in operation if they lost their NRL grazing privilege. However, some predictions can be made.

The 11 operators with over 25 percent dependence could be expected to go out of the livestock production business under this alternative. For the 78 operators who are 3 percent to 15 percent dependent and the 7 who are 16 percent to 25 percent dependent on NRL forage, impacts to individual operators would be unidentifiable. However, some of these operations could go out of the livestock business depending upon each operator's stability in other areas of operation and upon each operator's desire to stay in the livestock production industry.

Furthermore, although percent dependence by AUMs on NRL is one indicator of critical dependence, season of use can be critical to the operator for a much smaller percentage of dependence. One example is winter use by sheep operations within the ES area. The amount of sheep an operator can own is directly related to the amount of available winter range. Therefore, operators of any allotment with winter sheep use are critically dependent upon use of the allotment.

In conclusion, since many of the operations are of the small family type, many operations depend upon NRL grazing to accomplish trailing to and from national forest lands (NFL) or private lands, and many of the eliminated AUMs involve critical winter use for sheep which would be difficult or impossible to replace, it is expected that withdrawal of NRL grazing would cause many of the 146 operators to go out of the livestock business.

Another effect of this alternative would be the increased cost of hauling livestock by truck and increased road maintenance on about 100 miles, with approximately 75 miles of new road construction. These estimates are based on topography of the ES area and access to NRL. Many livestock operations in this area include trailing cattle or sheep across NRL, NFL or private lands and back again each year. Operations of livestock would be limited by lack of access to some areas of NFL where trailing across NRL provides the only access.

Socio-Economic Conditions

POPULATION

Implementation of Alternative B could cause a slight impact on area population levels due to a decrease in the number of livestock ranchers. As indicated in the livestock grazing section, a portion of the 146 permittees would be forced out of business (depending on the viability of their operation and the critical nature of withdrawn

AUMs). This would likely result in a recombining of properties, which would mean that not all operators would be forced to relocate. However, some operators forced out of business could relocate outside of the ES area, causing a slight downward pressure on the area's population.

INCOME

Elimination of grazing would reduce the income generating capacity of the ES area's livestock industry by 35,369 AUMs (1975 licensed active use). This loss would cause a decline in direct livestock related income of $102,570.10 (35,369 x $2.90 = $102,570.10). When multiplied by the industry income multiplier (1.487), the total direct and indirect reduction in income would be $152,521.74. This reduction in income would amount to 2.34 percent of 1974 ES area total livestock-related income and 0.1 percent of total personal income. While the adverse impacts would not appear too significant on an area basis, there would be a severe impact on permittees, forcing a recombination of properties as some operators sold properties and migrated to cities within the area, or left the area completely.

Livestock operators would experience additional costs of operation of an uncertain nature. Livestock would have to be hauled by truck because of the loss of trailing rights across NRL. Additional roads would be needed (approximately 75 miles of new road construction), and increased maintenance would be necessary on about 100 miles of existing roads. Additional maintenance costs are difficult to calculate at this point due to the degree of maintenance required above current levels. Total maintenance costs for this type of road would be about $200 per mile annually. Since some of the construction and maintenance costs would be borne by operators, these additional livestock transportation costs would combine to increase operating costs. This would add to the cost-price squeeze presently being experienced by livestock operators, reducing the incomes of those affected. Thus, with high operating costs, lower incomes, and some operators going out of business, it appears that this alternative would have a severe adverse impact on certain area operators.

There would be a positive short-term impact on contract construction-related income since elimination of grazing would require extensive boundary fencing to keep domestic livestock off NRL. Approximately 1,012 miles of fencing would be required, with initial installation costs of approximately $2,428,800 and annual maintenance costs of about $48,575.

New road construction would also be required to facilitate livestock movement as discussed above. Approximately 75 miles of new road construction, costing about $7,500 per mile, would be required.

Thus, there would be a short-term impact on the construction sector of $562,500 in new construction, with an estimated yearly maintenance cost of $15,000 ($200 per mile). Combined fence and road construction costs would amount to $2,991,300 (1976 dollars) with maintenance costs being $63,575 (additional unknown maintenance costs associated with 100 miles of road discussed in the previous section would be added to this). If area households capture 20 percent of initial construction costs, area personal income would increase by $598,260. This amount would be spread out over several years, so yearly comparisons with a base period are not possible. If 30 percent of yearly maintenance expenditures are captured by area households, it would result in an ongoing yearly income increase of $19,073 after the installation phase.

Recreation-related income would not be much affected by this alternative. This alternative would have little effect on big game populations; as indicated in the wildlife section of this alternative, there would be little change, with the possibility of slightly reduced wildlife populations. However, a slight downward pressure on income generated from the wildlife resource could be experienced due to closure of some private lands, which would in turn limit access to NRL.

As for government-related income, two or three additional BLM employees would be hired on a year-round basis at an annual salary of about $9,000 each, with overhead costs estimated at $3,000 each. These positions would all be located in the ES area, and after deductions from the salaries are considered, the multiplier would bring about an increase in area income of about the gross amount of the salaries. Approximately 20 percent of overhead costs could also be expected to be captured as area income.

EMPLOYMENT

A loss of employment in the livestock industry is possible. Exact magnitudes are difficult to determine since they would depend on the manner

in which properties were recombined and on alternative land use decisions by owners.

During the construction phase of fencing and road building, about 50 man-years of employment would be generated. Maintenance would likely result in an additional 2 man-years annually, probably to be allocated for part-time or seasonal work.

Any impact on employment due to recreation-related expenditures in the area is uncertain, but if it does occur, it is expected to be minimal.

As previously mentioned, government employment will increase by two or three permanent positions.

In summary, due to uncertainty surrounding livestock related employment, it is not possible to determine what the net effect of this alternative would be on area employment. However, it is possible that there would be a short-term increase lasting only through the construction phase.

SOCIAL WELL-BEING

This alternative would have a slight adverse impact on well-being in the ES area. Any short-term gains in construction employment or new government positions would come at the expense of livestock operators who would feel major adverse impacts, reducing the value of their property and forcing upon them changes in life-style and community associations. In addition, the expenditure of public funds without any observable associated gain would have a slight adverse impact on both a local and national scale.

PUBLIC FINANCE AND TAX BASE

Elimination of grazing would also have some effect on the area's funding capabilities. It would result in a reduction of animal units of carrying capacity totaling 3,392.08 (based on present allowable use of 40,705 AUMs) for ES area ranches. This would result in a decrease in value of area livestock ranches of about $3,392,083, which would translate into a decrease in the area tax base of about $1,017,625. This reduction would amount to 1.175 percent of 1975 ES area assessed valuation, which accounted for $76,783 in total tax revenue. Although actual reductions in the market value of area ranches might not be $3,392,083 due to demands for land for other than livestock income purposes, still the amount is a paper loss directly affecting certain ranch properties and also affecting area tax revenue potential.

SOCIO-CULTURAL ATTITUDES

Considerable local resentment and antagonism could be expected as a result of federally imposed elimination of livestock grazing. This action would conflict sharply with local self-deterministic values and attitudes. Local public reaction would be especially strong since the elimination would conflict with expressed local attitudes and values regarding local control of public and private lands and continued economic growth. The intensity of feelings generated by the movement away from a firmly accepted traditional area land use would most certainly push the matter into the political arena for attempted resolution.

ALTERNATIVE C: CUSTODIAL MANAGEMENT OF GRAZING

Description

The custodial management alternative would have the following components:

1. The 14 existing AMPs, covering 12 undivided allotments and 3 allotment subunits (89,300 acres total), would be continued, as shown in table 8-11. This assumption is based on the observation that existing AMPs were developed generally for livestock operators who believe in the application of more intensive management principles and who are also already achieving beneficial effects from their grazing plans. Thus, there is no reason to believe that these operators would abandon management systems that are successful.

2. Term permits for periods up to ten years would be issued for 129 undivided allotments and 1 allotment subunit (419,905 acres). The permits would specify the class of livestock, the number of livestock allowed, and the season of use (refer to table 8-12).

3. Livestock grazing would be eliminated on 9 allotments (3,020 acres), listed in table 8-13.

4. Unallotted status (no grazing use) would be continued on 45 tracts of NRL (13,550 acres).

In addition, range users (allottees) would be required to continue maintenance of existing range improvements on NRL in a serviceable condition. The allottees would be allowed to construct new range improvements on NRL with prior approval from BLM.

However, BLM would not be committed to the continuation of the existing AMPs and range-related studies, and no new AMPs, range improvements, or range studies would be developed.

TABLE 8-11
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
EXISTING ALLOTMENT MANAGEMENT PLANS

Allotment Name & Number	Acres	Class & AUMs a/	Season	Grazing System
4006 Dry Mesa:				
A Escalante Subunit	2,280	C-76	11/27-12/31	1-pasture, 2-treatment rest rotation
B Dry Mesa Subunit	16,165	C-489	05/08-05/31 11/01-12/31	4-pasture, 4-treatment rest rotation
4007 Sawmill Mesa	12,095	C-341	11/01-12/15	1-pasture deferred
4008 25 Mesa	10,405	C-773	10/15-02/28 05/03-05/05	1-pasture deferred
4012 Canal	10,650	C-831	05/15-07/31 10/16-11/15	4-pasture, 4-treatment rest rotation
4013 Ben Lowe	5,490	C-446	05/21-05/31 10/16-11/30	3-pasture, 3-treatment rest rotation
4502 Surface to Leroux	3,230	C-443	05/26-06/15 10/16-10/21	2-pasture deferred rotation
4503 Stingley Gulch	1,080	C-98	05/10-06/09	2-pasture, 2-treatment rest rotation
4528 Oak Ridge	3,600	C-238	05/21-06/15 10/16-11/04	3-pasture, 3-treatment rest rotation
4529 Reynolds Creek	1,200	C-158	06/15-06/20 10/06-10/11	2-pasture deferred rotation
4530 McDonald Mesa	3,185	C-122	06/01-06/20 10/07-10/13	2-pasture deferred rotation
4537 Young's Peak:				
Q Young's Peak Subunit	2,260	C-113	05/15-07/14 09/01-09/30	1-pasture, 4-treatment rest rotation
4549 Dry Creek	3,110	C-193	05/16-06/15 10/01-11/03	2-pasture deferred rotation
5516 Piney	8,335	C-540 H-17	06/01-10/31	5-pasture, 5-treatment rest rotation
5521 Highway 90	6,215	S-265	03/25-06/02	6-pasture, 2-treatment rest rotation
		C-4,861 S- 265 H- 17		
TOTALS	89,300	5,143		

a/ C = cattle, S = sheep, H = domestic horses; AUMs = animal unit month.

Range use supervision would be limited to trespass control in accordance with federal regulation (43 CFR 9230). Costs of the range management program would be reduced by lowering pay levels of the remaining range positions.

Analysis

Soils

The water resources section of this chapter states that infiltration rates under this proposal would remain essentially unchanged. However, depending upon the predicted changes in vegetative cover density for each vegetative type as shown on table 8-16 (see Vegetation below), the runoff, peak discharge, and sediment would vary.

On those allotments (109,920 acres) on which there would be no change in runoff and sediment yield, there would be no change in soil loss and therefore no change in the soil. The allotments (364,310 acres) on which there would be an increase in runoff and sediment yield would have soil losses; however, although the effect of the loss would cause changes in the soil, the magnitude or kind of changes cannot be predicted as there is no known method or data to substantiate changes. For allotments (52,295 acres) on which there would be a decrease in runoff and sediment yield, there would be a reduction in soil loss. As stated above, the effects of the reduction in soil loss would cause change in the soil, but the magnitude or kind of change cannot be predicted as there are no known data to substantiate any changes.

Water Resources

Hydrologic impacts of custodial management would vary from allotment to allotment. Infiltration rates would remain essentially unchanged. Table 8-16 (under Vegetation below) shows the predicted change in cover density for each vegetative type within each allotment. With Gifford, Hawkins, and Williams (1975) adaptation of the SCS curve number method, it was determined that for areas that show increased cover (52,275 acres), 10 to 40 percent decreases in runoff can be expected depending on the amount of additional cover. For those areas with decreased cover predicted (304,310 acres), 10 to 50 percent increases in runoff can be expected. Areas with no predicted change in vegetative cover (109,920 acres) would have no change in runoff or sediment yield. Where there are increases in runoff, there would be increases in sediment yield and vice versa. Quantification of runoff and sediment yield cannot be done for individual allotments with existing data and methodologies.

Vegetation

Short-term impacts under this alternative are listed by grazing system and season of use in table 8-14. Long-term impacts are summarized in tables 8-15 and 8-16. Predicted range condition by 2006 under this alternative is 104,670 acres in good, 221,890 acres in fair, and 199,215 acres in poor condition. Total vegetative production for the ES area is predicted to be 46,845 AUMs by 2006.

ENDANGERED PLANTS

The impacts to endangered plants under the custodial management alternative would be the same as for the proposed action.

Wildlife: Terrestrial

Under this alternative, wildlife populations, economic return, and hunter opportunities would all decrease. Serious forage conflicts between livestock and big game and reduced food and cover for small game would result on all allotments except areas under existing AMPs. Furthermore, new range improvements would not be implemented as needed to increase forage for both livestock and wildlife. Without increases in forage, populations cannot be expected to increase. In addition, watering facilities may not remain operable for wildlife use after livestock are removed each year. In some areas of the ES area, this would require wildlife to move to new areas where water is available. As a result, populations of big game species could be expected to decrease 10 to 20 percent (1,500 to 3,000 deer, 120 to 240 elk, and 25 to 50 antelope).

Wildlife: Riparian and Aquatic

Erosion of critical watershed areas, such as soils derived from Mancos shale and steep terrains, would increase the sediment load and turbidity of streams. A continued decline of algae, aquatic plants, invertebrates, and fish making up the aquatic system would result. The sediment load of the North Fork, the Uncompahgre, and the Gunnison rivers would continue at a high level, and the potential of these areas to support desirable fish species would diminish.

No protection would be given to riparian vegetation, and cattle would congregate in stream

TABLE 8-12
ALTERNATIVE C: CUSTODIAL MANAGEMENT: PROPOSED CUSTODIAL ALLOTMENTS

Allotment Number & Name	Acres NRL	Class-AUMs a/	Season of Use
4001 Dominguez*	58,335	C-1,833	10/16-05/30
4002 Lower Escalante	2,240	S-300	01/09-01/30
4005 Fall Cabin	360	C-18	05/11-05/31
			10/16-10/31
4006 Dry Mesa:			
C Smith Ranch Subunit	150	C-50	04/25-05/31
D Escalante Creek Subunit	300	C-50	04/25-04/27
4010 Monitor Mesa	15,735	C-1,174	05/16-05/31
			10/16-11/30
4011 Lower Roubideau Canyon	480	C-27	10/06-10/21
4014 Joker	1,835	C-87	05/21-10/31
4015 White Ranch	415	C-10	04/01-05/31
			10/16-02/28
4016 Wells Gulch	16,955	S-2,380	11/15-04/30
4017 Alkali Flats*	27,830	S-2,651	03/01-02/28
			10/15-10/30
4021 Point Creek	1,000	S-101	03/15-05/20
4022 Petrie Mesa	13,860	S-1,258	12/01-04/30
4024 Dirty George	2,385	C-236	05/16-06/15
			10/16-11/15
4025 Ward Creek-Doughspoon	17,910	C-441	05/01-06/15
			10/15-11/15
4026 Escalante Canyon	1,270	C-20	01/01-02/07
4501 Milk Creek	105	C-16	08/15-08/31
4504 Leroux Creek	2,555	C-190	05/15-08/31
4505 Juniper Knob	120	S-10	05/01-06/05
4506 Oak Mesa	1,350	S-64	01/11-02/10
			05/01-06/15
			06/16-09/15
4507 Jay Creek	9,205	C-879	05/16-10/30
4509 Upper Jay Creek	430	C-66	05/20-06/15
			09/15-10/30
4511 Overland	160	C-14	06/16-06/30
			10/16-10/30
4512 East Roatcap	30	C-10	06/19-10/12
4513 Stevens Gulch	6,555	C-694	05/01-06/30
4514 Upper Terror Creek	30	C-3	09/15-10/15
4515 Freeman Gulch	620	C-53	06/01-10/31
4516 North Fork	23,420	S-1,079	11/05-07/19
4517 Coal Gulch*	7,720	S-394	05/01-08/05
		C-90	10/23-11/13
4518 Pilot Creek	45	S-33	06/16-07/30
			10/11-11/12
4519 Muddy Creek	500	S-16	05/16-06/25
4520 Spring Creek	120	C-25	06/12-09/15
4521 Stock Driveway	120	S-6	06/01-06/06
			11/01-11/06
4522 Downing	120	C-24	05/26-06/17
			09/16-09/30

a/ C = cattle, S = sheep, H = domestic horses; AUMs = animal unit month.
* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-12
ALTERNATIVE C: CUSTODIAL MANAGEMENT: PROPOSED CUSTODIAL ALLOTMENTS (cont.)

Allotment Number & Name	Acres NRL	Class-AUMs a/	Season of Use
4523 Williams Creek	110	C-8	05/16-07/15
4524 Deep Creek	160	C-3	06/01-10/15
4525 Anthracite Creek	1,115	C-118	06/04-09/15
4526 Crystal Creek	480	C-51	05/16-09/30
4527 Jumbo Mountain	4,970	C-413	05/11-06/15
4531 Popp Ranch	265	C-4	05/15-06/14
4532 McDonald Ranch*	7,330	S-529	03/01-05/31
		H-7	10/01-02/28
4535 Home Place	160	C-15	10/07-10/15
4536 West Young's Peak	160	C-6	05/01-07/31
4537 Young's Peak:			
R Crawford Subunit	260	C-22	06/17-06/25
4538 Missouri Flats	120	C-4	06/12-09/15
4539 Cottonwood Creek	120	C-8	05/20-06/03
			09/15-09/29
4540 North Saddle Peak	240	C-31	06/01-08/31
4541 Sunshine Mesa	40	C-5	05/16-06/15
4543 South Saddle Peak	220	C-13	06/16-06/20
			10/10-10/15
4548 Creek Bottom	185	C-5	06/01-10/15
5002 Dedication Site	1,915	C-44	03/01-04/06
5003 Selig Canal*	7,665	S-330	05/16-05/25
			10/01-10/10
			12/15-02/16
5008 Brush Point	18,205	S-1,123	11/14-05/06
5010 Dead Horse	955	C-171	05/11-10/25
5011 Gould Reservoir	2,825	C-305	05/05-06/30
5012 Cedar Point	620	C-55	05/30-06/30
			09/01-09/30
5013 Iron Canyon	1,335	C-95	05/06-06/30
5014 Poison Spring	1,570	C-99	05/01-06/30
5015 Grizzly Gulch	1,930	C-230	05/11-08/12
5016 Black Canyon	440	C-45	05/11-06/30
5017 Green Mountain*	20,825	S-1,018	05/03-11/25
		C-629	
5020 Black Ridge	6,875	S-400	11/16-01/15
5022 Rabbit Gulch	1,250	C-35	11/10-12/14
5025 Fruitland Mesa	80	S-2	05/01-11/30
5026 Star Nelson Airport	80	C-5	01/02-02/28
5027 Adobe	300	C-24	05/15-06/14
5028 Doug Creek	400	C-60	05/01-06/15
5029 Spring Gulch	1,430	C-110	06/01-09/20
5030 Bostwick Park	5,495	C-188	04/16-10/31
5033 Pinyon Springs	1,030	C-131	06/02-10/16
5036 Big Gulch	40	S-5	11/01-11/30
5038 Red Canyon	80	C-3	05/10-10/30
5039 Onion Valley	40	C-16	07/01-09/01
		H-1	09/01-11/15
5040 Pine Ridge	80	C-14	06/01-11/15
5041 East Gould Reservoir	620	C-20	06/06-06/15
5043 Collins	200	C-10	05/05-06/04
5044 Big Pasture	200	C-15	05/16-06/15
5045 Black Bullet	90	H-3	11/01-11/30
5046 Big Gulch*	440	S-35	03/02-04/17
5047 Mesa Creek*	640	C-55	05/01-10/15

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-12
ALTERNATIVE C: CUSTODIAL MANAGEMENT: PROPOSED CUSTODIAL ALLOTMENTS (cont.)

Allotment Number & Name	Acres NRL	Class-AUMs a/	Season of Use
5048 Morrow Point	1,035	C-8	05/20-06/10
5049 Smith Fork	450	C-19	05/01-06/10
			11/06-11/15
5050 Allen Reservoir	200	C-24	05/16-06/04
			10/16-10/20
5502 Sandy Wash	7,530	S-707	12/01-03/16
5503 Green	450	C-39	05/25-06/19
5504 Roatcap	3,070	S-264	02/17-03/21
5505 Transfer	2,970	C-214	10/16-11/16
5507 Pipeline	19,190	C-333	11/11-11/26
		S-1,382	12/07-06/09
5508 Government Springs	2,260	S-125	05/16-06/15
			10/16-11/15
5509 Coal Creek	320	C-44	05/16-05/30
			11/08-11/15
5510 Bald Hills	205	C-21	05/29-06/30
			10/11-11/09
5511 Shavano Mesa	2,015	S-200	12/20-02/06
5512 Franklin Mesa*	3,600	S-350	12/16-02/26
5513 Dry Creek Basin*	5,425	S-300	12/11-02/16
5514 East Fork Dry Creek	135	C-11	06/01-10/27
5515 Olathe Reservoir	185	C-17	05/16-10/15
5517 Spring Creek Canyon	440	C-35	05/31-10/15
5518 Dave Wood	2,565	S-176	04/15-05/06
5520 Lower Horsefly	10,365	S-665	12/01-02/15
			03/01-05/15
5522 Beaver Hill	19,785	S-1,022	05/16-06/30
			10/01-10/20
			12/08-12/28
5523 Horsefly	640	C-38	05/11-07/02
			09/12-10/14
5524 Duckett Draw	275	C-6	04/01-12/31
			11/01-12/31
5525 Dry Creek	100	C-9	09/20-10/19
5529 Log Hill	4,345	C-189	05/16-06/13
			10/16-10/31
5530 Billy Creek	3,995	C-148	05/01-07/01
		H-2	08/20-09/15
5532 Burro Ridge	200	C-15	05/01-06/15
5533 Onion Lakes	630	C-15	10/16-11/30
5534 Shin Park	3,970	S-251	11/30-01/16
5535 Cedar Creek	240	C-6	06/01-06/30
5536 South Canal	2,115	S-57	01/01-01/17
5538 Rock Ditch	55	C-5	11/01-11/30
5540 Dry Gulch	4,860	S-808	03/01-06/24
			12/28-02/28
5542 Bosgal	50	S-5	09/01-02/28
5543 Waugh	200	S-10	12/16-02/28
5544 Kelly	80	S-2	11/01-12/15
5545 Henshaw	170	S-12	10/15-11/15
5546 Waterdog Basin	400	C-35	03/20-10/30
5547 Slagle Pass	310	C-30	07/28-09/27
5548 Washboard Rock	760	S-34	05/16-09/15
5549 High Park	1,660	S-60	07/01-09/30
		H-1	
5551 Dexter Creek	65	H-3	06/01-06/21

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-12
ALTERNATIVE C: CUSTODIAL MANAGEMENT: PROPOSED CUSTODIAL ALLOTMENTS (cont.)

Allotment Number & Name	Acres NRL	Class-AUMs a/	Season of Use
5561 East Fork	80	S-3 H-2	06/15-07/31 10/01-10/31
5562 Hillside	160	C-10	06/01-09/30
5563 Moonshine Park	230	C-7	07/01-09/30
5564 Gravel Pit	40	S-4	10/01-11/08
5565 Tommy Creek	120	C-3	04/16-06/15
5566 Cow Creek	520	C-70	06/20-07/10
5567 Busted Boiler	40	C-2	08/01-09/30
5568 Baldy	680	C-88	06/01-09/30
5569 Hairpin	500	S-18	05/16-05/30 10/01-10/10
5570 Cedar	2,125	C-315	05/01-06/30
5574 Tappan Creek	240	S-11	04/11-05/10 11/15-11/19
		C-10,831 S-18,200 H- 19	
TOTALS	419,905	29,050	

TABLE 8-13
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
PROPOSED ELIMINATION OF GRAZING

Tract	Acres NRL	AUMs Eliminated
5037 Black Mesa	500	6
5552 Dallas	240	24
5553 Fisher Creek	480	34
5555 Taylor Draw	325	55
5556 Burro Creek	120	15
5557 Alkali	485	20
5559 South Fork	120	12
5560 Cookie Tree	640	55
5572 McKenzie Creek	110	5
TOTALS	3,020	226

TABLE 8-14
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE

Allotment No. & Name	Grazing Systems or Season of Use	Short-Terms Impacts a/
EXISTING AMPs		
4006 Dry Mesa: A Escalante Subunit 4503 Stingley Gulch 5521 Highway 90	Rest Rotation--Two Treatments (9,575 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Allows some seedling establishment.
4013 Ben Lowe 4528 Oak Ridge	Rest Rotation--Three Treatments (9,090 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4012 Canal	Rest Rotation--Four Treatments (10,650 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.

a/ Short-term impacts on vegetation would last one to three years.

TABLE 8-14
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name	Grazing Systems or Season of Use	Short-Terms Impacts a/
4006 Dry Mesa: B Dry Mesa Subunit 4537 Young's Peak: Q Young's Peak Subunit	Rest Rotation--Four Treatments (18,425 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
	Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5516 Piney	Rest Rotation--Five Treatments (8,335 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
	Utilize forage in fall.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
	Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased.
	Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
4502 Surface to Leroux 4529 Reynolds Creek 4530 McDonald Mesa 4549 Dry Creek	Deferred Rotation (10,725 acres):	
	Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
	Defer grazing one growing season, and utilize forage in fall.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4007 Sawmill Mesa 4008 25 Mesa	Deferred (22,500 acres):	
	Defer grazing during growing season, and utilize forage in fall or winter each year.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.

TABLE 8-14
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
ELIMINATION OF GRAZING			
5037 Black Mesa	5556 Burro Creek	No Livestock Grazing (3,020 acres)	Vigor, reproduction, and litter accumulation increased. Seedling establishment allowed.
5552 Dallas	5557 Alkali		
5553 Fisher Creek	5559 South Fork		
5555 Taylor Draw	5560 Cookie Tree		
	5572 McKenzie Creek		
CUSTODIAL MANAGEMENT			
4001 Dominguez	4526 Crystal Creek	Spring and Fall or Season-Long Grazing (343,385 acres)	
4005 Fall Cabin	4531 Popp Ranch		
4010 Monitor Mesa	4532 McDonald Ranch		Vigor, reproduction, and litter accumulation reduced.
4014 Joker	4535 Home Place		
4015 White Ranch	4538 Missouri Flats		Seed trample reduced. (Some seed trample would occur.)
4016 Wells Gulch	4539 Cottonwood Creek		
4017 Alkali Flats	4540 North Saddle Peak		Seedling establishment reduced.
4022 Petrie Mesa	4541 Sunshine Mesa		
4024 Dirty George	4543 South Saddle Peak		
4025 Ward Creek-Doughspoon	4548 Creek Bottom		
	5003 Selig Canal		
4504 Leroux Creek	5008 Brush Point		
4506 Oak Mesa	5010 Dead Horse		
4507 Jay Creek	5015 Grizzly Gulch		
4509 Upper Jay Creek	5017 Green Mountain		
4511 Overland	5025 Fruitland Mesa		
4512 East Roatcap	5029 Spring Gulch	5508 Government Springs	5525 Dry Creek
4515 Freeman Gulch	5030 Bostwick Park	5509 Coal Creek	5529 Log Hill
4516 North Fork	5033 Pinyon Springs	5510 Bald Hills	5530 Billy Creek
4517 Coal Gulch	5038 Red Canyon	5514 East Fork Dry Creek	5540 Dry Gulch
4518 Pilot Creek	5039 Onion Valley	5515 Olathe Reservoir	5542 Bosgal
4520 Spring Creek	5040 Pine Ridge	5517 Spring Creek Canyon	5546 Waterdog Basin
4521 Stock Driveway	5047 Mesa Creek	5520 Lower Horsefly	5547 Slagle Pass
4522 Downing	5049 Smith Fork	5522 Beaver Hill	5548 Washboard Rock
4524 Deep Creek	5050 Allen Reservoir	5523 Horsefly	5549 High Park
4525 Anthracite Creek	5507 Pipeline	5524 Duckett Draw	5561 East Fork
			5562 Hillside
			5563 Moonshine Park
			5565 Tommy Creek
			5567 Busted Boiler
			5568 Baldy
			5569 Hairpin
			5574 Tappan Creek

TABLE 8-14
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
YEARLY SHORT-TERM IMPACTS ON VEGETATION BY GRAZING SYSTEM OR SEASON OF USE (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4006 Dry Mesa	5016 Black Canyon	Spring Grazing (32,335 acres)	
C Smith Ranch Subunit	5027 Adobe		
D Escalante Creek	5028 Doug Creek		Vigor, reproduction, and litter accumulation reduced.
4021 Point Creek	5036 Big Gulch		
4501 Milk Creek	5041 East Gould Reservoir		Seed trample reduced.
4513 Stevens Gulch			
4519 Muddy Creek	5043 Collins		
4523 Williams Creek	5044 Big Pasture		
4527 Jumbo Mountain	5046 Big Gulch		
4536 West Young's Peak	5048 Morrow Point		
4537 Young's Peak	5503 Green		
R Crawford Subunit	5518 Dave Wood		
5002 Dedication Site	5532 Burro Ridge		
5011 Gould Reservoir	5535 Cedar Creek		
5012 Cedar Point	5551 Dexter Creek		
5013 Iron Canyon	5566 Cow Creek		
5014 Poison Springs	5570 Cedar		
4002 Lower Escalante	5511 Shavano Mesa	Fall or Winter Grazing (Deferred Grazing)(44,185 acres)	
4011 Lower Roubideau Canyon	5512 Franklin Mesa		
4026 Escalante Canyon	5513 Dry Creek Basin		Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4514 Joker	5533 Onion Lakes		
5020 Black Ridge	5534 Shin Park		
5022 Rabbit Gulch	5536 South Canal		
5026 Star Nelson Airport	5538 Rock Ditch		Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5045 Black Bullet	5543 Waugh		
5502 Sandy Wash	5544 Kelly		
5504 Roatcap	5545 Henshaw		
5505 Transfer	5564 Gravel Pit		

TABLE 8-15
ALTERNATIVE C: CUSTODIAL MANAGEMENT:
PREDICTED RANGE CONDITION BY ALLOTMENT AND VEGETATIVE TYPE

Allotment and Vegetative Types	Present Range Condition			Predicted Range Condition (by 2006)			Total Acres
	Good	Fair	Poor	Good	Fair	Poor	
EXISTING AMPs							
4006 Dry Mesa:							
A Escalante Subunit							2,280
Saltbush	-	1,480	-	1,480	-	-	
Sagebrush	-	120	680	120	680	-	
B Dry Mesa Subunit							16,165
Pinyon-Juniper	1,235	6,725	-	4,595	3,365	-	
Saltbush	-	1,680	-	1,680	-	-	
Sagebrush	4,205	2,320	-	6,525	-	-	
4007 Sawmill Mesa							12,095
Pinyon-Juniper	1,080	3,040	6,935	2,600	8,455	-	
Saltbush	-	800	-	800	-	-	
Sagebrush	-	-	240	-	240	-	
4008 25 Mesa							10,405
Pinyon-Juniper	-	-	7,565	-	7,565	-	
Saltbush	-	2,320	-	2,320	-	-	
Broadleaf Trees	360	160	-	520	-	-	
4012 Canal							10,650
Pinyon-Juniper	-	1,600	2,690	800	3,490	-	
Saltbush	-	-	6,360	-	6,360	-	
4013 Ben Lowe							5,490
Pinyon-Juniper	-	1,515	240	755	1,000	-	
Saltbush	-	-	2,855	-	2,855	-	
Sagebrush	-	880	-	880	-	-	
4502 Surface to Leroux							3,230
Pinyon-Juniper	60	1,590	-	855	795	-	
Mountain Shrub	1,580	-	-	1,580	-	-	
4503 Stingley Gulch							1,080
Pinyon-Juniper	-	930	-	465	465	-	
Mountain Shrub	-	150	-	150	-	-	
4528 Oak Ridge							3,600
Pinyon-Juniper	-	230	-	115	115	-	
Mountain Shrub	390	2,905	-	3,295	-	-	
Sagebrush	-	75	-	75	-	-	
4529 Reynolds Creek							1,200
Pinyon-Juniper	45	175	-	130	90	-	
Mountain Shrub	620	-	-	620	-	-	
Sagebrush	-	360	-	360	-	-	
4530 McDonald Mesa							3,185
Pinyon-Juniper	-	1,945	-	970	975	-	
Saltbush	-	-	880	-	880	-	
Sagebrush	-	360	-	360	-	-	
4537 Young's Peak:							
Q Young's Peak Subunit							2,260
Pinyon-Juniper	-	2,260	-	1,130	1,130	-	
4549 Dry Creek							3,110
Pinyon-Juniper	-	1,540	-	770	770	-	
Mountain Shrub	360	1,210	-	1,570	-	-	
5516 Piney							8,335
Mountain Shrub	-	2,195	900	2,195	900	-	
Sagebrush	-	-	5,240	-	5,240	-	
5521 Highway 90							6,215
Pinyon-Juniper	860	3,800	1,555	2,760	3,455	-	
Subtotals	10,795	42,365	36,140	40,475	48,825	0	89,300
Other NRL	64,195	173,065	199,215	64,195	173,065	199,215	436,475
TOTAL	74,990	215,430	235,355	104,670	221,890	199,215	525,775
Summary of changes				+ 29,680 +40%	+ 6,460 +3%	- 36,140 -15%	

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4001 Dominguez	5,600	41,020		Hija Atca	4,320		Hija Atca
Pinyon-Juniper			55	1 2		45	1 2
Saltbush			12	2 5		12	2 4
Desert Shrub			12	2 5		12	2 3
Sagebrush			51	1 2		40	1 2
4002 Lower Escalante	335	1,665		Orhy Atca	280		Orhy Atca
Pinyon-Juniper			50	10 10		45	10 10
Saltbush			36	5 10		30	5 10
Desert Shrub			15	T -		15	T -
Sagebrush			24	T -		20	T -
4005 Fall Cabin	40	300		Sihy Epvi	40		Sihy Epvi
Pinyon-Juniper			34	6 3		34	6 3
4006 Dry Mesa	1,185	14,160		Orhy Atca Artemisia	1,585		Orhy Atca Artemisia
Pinyon-Juniper			70	5 - 30		80	10 - 35
Saltbush			50	10 20 20		55	15 25 22
Sagebrush			50	5 T 40		55	10 10 40
4007 Sawmill Mesa	790	9,170		Hija Kocr Atca Arno	1,210		Hija Kocr Atca Arno
Pinyon-Juniper			45	22 3 3 7		60	25 10 5 10
Saltbush			19	84 - 11 -		30	84 - 15 -
Sagebrush			24	42 - - 17		40	42 - - 20
4008 25 Mesa	810	6,630		Hija Atca Spcr	985		Hija Atca Spcr
Pinyon-Juniper			32	21 4 -		40	25 10 -
Saltbush			36	25 10 -		45	25 15 -
Broadleaf Trees			67	- 3 33		70	- 3 33
4010 Monitor Mesa	1,435	8,760		Hija Kocr Arno Atca	1,300		Hija Kocr Arno Atca
Pinyon-Juniper			32	5 3 10 1		30	5 3 10 1
Sagebrush			50	7 2 8 1		45	7 2 8 1
				Spcr			Spcr
Broadleaf Trees			67	33 - - 3		40	25 - - 2
4011 Lower Roubideau	45	400		Spcr Atca	10		Spcr Atca
Broadleaf Trees			67	33 3		40	30 3

Note: Present production, vegetative density, and species composition are based on Bureau of Land Management, Uncompahgre Basin Resource Area, unit resource analyses and allotment management plans. For a discussion of methodology and data base for current production levels, refer to appendix 4.
Potential production is based on two reports by the Soil Conservation Service: the Paonia Soil Survey Report and the Ridgway Soil Survey Report. For a discussion of methodology and data base for potential production, see appendix 4.
Predicted production and other information is based on present trend studies and apparent trend of each allotment in the Uncompahgre Basin Resource Area. It was assumed that current range trend will not change by 2006 on allotments without AMPs.
a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.
b/ Vegetative density as defined in the glossary is presented as a representative number for the whole type.
c/ "T" = trace. "-" = not a key species in that type in that allotment. "0" = no trace of this key species present in that type in that allotment.
See list at end of table for scientific and common names of key species listed here by scientific abbreviations.

TABLE 8-16

CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4012 Canal	1,000	8,875		Orhy Kocr Atca	1,220		Orhy Kocr Atca
Pinyon-Juniper			25	2 1 2		50	10 10 10
Saltbush			20	1 - 1		30	5 - 5
4013 Ben Lowe	570	4,570		Orhy Hija Atca Cemo	755		Orhy Hija Atca Cemo
Pinyon-Juniper			53	1 4 - 1		65	10 10 - 10
Saltbush			43	3 10 3 -		50	10 15 10 -
Sagebrush			36	2 10 - -		45	10 15 - -
4014 Joker	115	1,050		Agropyron Amal	150		Agropyron Amal
Pinyon-Juniper			35	70 3		45	70 3
4015 White Ranch	25	265		Hija Atca Cemo	35		Hija Atca Cemo
Pinyon-Juniper			30	20 4 3		40	25 10 5
4016 Wells Gulch	2,680	7,160		Hija Orhy Atco Atca	2,680		Hija Orhy Atco Atca
Pinyon-Juniper			58	26 T 2 -		58	26 T 2 -
Desert Shrub			16	20 5 2 1		16	20 5 2 1
4017 Alkali Flats	3,560	12,220		Hija Orhy Atco Atca	2,780		Hija Orhy Atco Atca
Pinyon-Juniper			36	- 6 9 5		30	- 6 9 5
Saltbush			19	- - - 21		15	- - - 20
Desert Shrub			25	20 T 25 5		20	20 T 25 5
Mountain Shrub			50	- 2 - 2		47	- 2 - 2
Sagebrush			24	42 T - -		20	35 T - -
4021 Point Creek	115	390		Hija Orhy Atco Atca	95		Hija Orhy Atco Atca
Desert Shrub			20	5 2 1 1		18	5 2 1 1
4022 Petrie Mesa	1,430	4,415		Hija Orhy Atriplex Eula	1,090		Hija Orhy Atriplex Eula
Pinyon-Juniper			31	3 1 11 -		31	3 1 11 1
Saltbush			24	7 1 30 5		20	7 1 25 3
Desert Shrub			13	Spcr 1 - 2 -		10	Spcr 1 - 2 -
4024 Dirty George	300	2,470		Hija Stvi Cemo Amal	200		Hija Stvi Cemo Amal
Pinyon-Juniper			49	10 - 1 2		40	8 - 1 2
Mountain Shrub			65	- 1 8 6		55	- 1 6 5
4025 Ward Creek-Doughspoon	700	6,505		Hija Atca Atco	650		Hija Atca Atco
Pinyon-Juniper			39	10 3 3		35	10 3 3
Saltbush			36	5 10 10		30	5 8 8
Desert Shrub			24	1 10 7		24	1 8 7
4026 Escalante Canyon	40	1,040		Hija Artr	40		Hija Artr
Pinyon-Juniper			40	15 5		40	15 5
Saltbush			30	15 5		30	15 5
4501 Milk Creek	15	115		Kocr Orhy Artr	15		Kocr Orhy Artr
Mountain Shrub			75	11 9 60		75	11 9 60

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4502 Surface to Leroux	495	2,630		Popr Agsm Cemo	655		Popr Agsm Cemo
Pinyon-Juniper			36	2 1 8		50	10 10 10
Mountain Shrub			75	4 4 3		80	15 15 10
4503 Stingley Gulch	125	1,070		Orhy Pose Pera Cemo	150		Orhy Pose Pera Cemo
Pinyon-Juniper			40	1 0 - 2		55	10 5 - 10
Mountain Shrub			55	4 8 3 7		70	10 10 5 10
4504 Leroux Creek	195	2,380		Stco Orhy Cemo Artr	140		Stco Orhy Cemo Artr
Pinyon-Juniper			37	- T 5 35		30	- T 2 35
Mountain Shrub			63	2 2 3 16		55	2 2 3 16
4505 Juniper Knob	10	75		Orhy Atca	10		Orhy Atca
Pinyon-Juniper			35	3 3		35	3 3
4506 Oak Mesa	95	1,190		Orhy Basa Cemo	80		Orhy Basa Cemo
Pinyon-Juniper			35	3 3 3		35	2 3 2
Mountain Shrub			72	7 7 1		65	5 7 1
4507 Jay Creek	1,030	7,295		Orhy Cemo	800		Orhy Cemo
Pinyon-Juniper			49	T 10		45	T 8
Mountain Shrub			72	1 14		60	T 10
4509 Upper Jay Creek	75	480		Agtr Atca	50		Agtr Atca
Pinyon-Juniper			28	5 3		25	2 2
Mountain Shrub			60	10 10		50	5 5
4511 Overland	20	180		Orhy Amal	20		Orhy Amal
Mountain Shrub			51	2 65		51	2 65
4512 East Roatcap	10	40		Agtr Amal	10		Agtr Amal
Mountain Shrub			51	2 65		51	2 65
4513 Stevens Gulch	865	4,325		Orhy Sihy Cemo	650		Orhy Sihy Cemo
Pinyon-Juniper			49	- 4 10		45	- 2 8
Mountain Shrub			72	1 4 3		65	1 3 3
Sagebrush			44	2 2 2		40	1 1 1
4514 Upper Terror Creek	5	35		Orhy Sihy Amal	5		Orhy Sihy Amal
Mountain Shrub			76	2 4 4		76	2 4 4
4515 Freeman Gulch	70	615		Agsm Cemo	70		Agsm Cemo
Pinyon-Juniper			52	4 6		52	4 6
Mountain Shrub			76	4 6		76	4 6
4516 North Fork	2,630	10,775		Hija Atca Orhy Cemo	2,165		Hija Atca Orhy Cemo
Pinyon-Juniper			56	10 6 T 3		45	10 5 T 2
				Atco			Atco
Saltbush			15	15 24 - -		13	15 22 - -
Desert Shrub			14	8 22 - -		12	8 20 - -
				Brin Amal			Brin Amal
Mountain Shrub			83	3 2 - -		65	3 2
				Hija Arno			Hija Arno
Sagebrush			38	34 13 - -		35	30 10 - -
				Atco			Atco
Annuals			24	33 21 - -		24	33 21 - -

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4517 Coal Gulch	770	6,890		Orhy Stco Cemo	595		Orhy Stco Cemo
Pinyon-Juniper			45	8 2 10		40	5 2 5
Mountain Shrub			82	8 2 5		65	5 2 5
4518 Pilot Creek	40	60		Agsm Amal	40		Agsm Amal
Mountain Shrub			90	10 T		90	10 T
4519 Muddy Creek	25	530		Brin Putr	25		Brin Putr
Mountain Shrub			85	10 2		85	10 2
Sagebrush			55	10 2		55	10 2
4520 Spring Creek	30	135		Brin Putr	30		Brin Putr
Mountain Shrub			85	10 2		85	10 2
4521 Stock Driveway	10	135		Brin Amal	10		Brin Amal
Mountain Shrub			82	4 5		82	4 5
4522 Downing	30	135		Brin Amal	30		Brin Amal
Mountain Shrub			82	4 5		82	4 5
4523 Williams Creek	10	120		Feid Cemo	10		Feid Cemo
Mountain Shrub			75	5 5		75	5 5
4524 Deep Creek	10	180		Feid Artr	10		Feid Artr
Mountain Shrub			80	5 10		80	5 10
Conifer			90	2 1		90	2 1
4525 Anthracite Creek	170	1,215		Agtr Stco Cemo Artr	125		Agtr Stco Cemo Artr
Mountain Shrub			62	2 3 5 16		52	2 3 2 10
Conifer			76	4 - T 5		65	3 - T 2
Broadleaf Trees			76	4 - T 5		65	2 - T 2
4526 Crystal Creek	60	425		Orhy Amal	60		Orhy Amal
Mountain Shrub			80	5 5		80	5 5
Conifer			75	T 2		75	T 2
4527 Jumbo Mountain	700	4,330		Stco Orhy Cemo Artr	555		Stco Orhy Cemo Artr
Pinyon-Juniper			46	- T 11 7		40	- T 8 7
				Atca			Atca
Saltbush			33	- T 6 -		25	- T 5 -
				Cemo			Cemo
Mountain Shrub			71	1 1 1 14		65	1 1 1 12
Sagebrush			44	2 2 2 57		40	2 2 2 50
				Syor			Syor
Conifer			90	6 - 6 -		80	5 - 5 -
Broadleaf Trees			90	6 - 6 -		80	5 - 5 -
4528 Oak Ridge	335	3,095		Orhy Agtr Artr	400		Orhy Agtr Artr
Pinyon-Juniper			47	T 1 28		55	10 10 30
				Amal			Amal
Mountain Shrub			70	3 3 35		80	10 10 35
				Artr			Artr
Sagebrush			40	0 0 85		50	5 5 70

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
4529 Reynolds Creek	190	1,335		Orhy Agtr Artr	210		Orhy Agtr Artr
Pinyon-Juniper			47	T 1 28		55	10 10 30
							Amal
Mountain Shrub			82	1 T 18		82	10 10 15
							Artr
Sagebrush			36	0 0 100		50	5 5 80
4530 McDonald Mesa	205	2,105		Agsm Atca Atco	310		Agsm Atca Atco
Pinyon-Juniper			45	3 5 -		55	10 10 -
Saltbush			20	5 10 10		30	10 15 10
Sagebrush			25	5 5 15		40	10 10 15
4531 Popp Ranch	15	260		Orhy Artr	15		Orhy Artr
Pinyon-Juniper			47	T 28		47	T 28
Sagebrush			36	- 100		36	- 100
4532 McDonald Ranch	725	3,060		Agsm Hija Atco Atca	585		Agsm Hija Atco Atca
Pinyon-Juniper			20	T 5 5 5		20	T 2 5 2
Saltbush			17	5 5 15 5		10	2 2 10 2
Sagebrush			28	5 5 5 10		25	3 3 5 5
4535 Home Place	15	100		Sihy Atco	15		Sihy Atco
Saltbush			28	5 64		28	5 64
4536 West Young's Peak	10	100		Agsm Atco Cemo	10		Agsm Atco Cemo
Pinyon-Juniper			73	1 - 4		73	1 - 4
Saltbush			28	- 64 -		28	- 64 -
4537 Young's Peak	240	1,500		Agsm Cemo	280		Agsm Cemo
Pinyon-Juniper			73	1 4		75	10 10
4538 Missouri Flats	5	135		Popr Amal	5		Popr Amal
Mountain Shrub			82	1 18		82	1 18
4539 Cottonwood Creek	10	135		Popr Amal	10		Popr Amal
Mountain Shrub			82	1 18		82	1 18
4540 North Saddle Peak	40	265		Popr Amal	30		Popr Amal
Mountain Shrub			82	1 18		70	1 15
4541 Sunshine Mesa	5	25		Sihy Amal	0		Sihy Amal
Pinyon-Juniper			24	20 41		20	10 25
4543 South Saddle Peak	20	255		Orhy Cemo	20		Orhy Cemo
Pinyon-Juniper			46	T 15		46	T 15
4548 Creek Bottom	10	175		Agtr Artr	10		Agtr Artr
Conifer			76	4 5		76	4 5
Broadleaf Trees			76	4 5		76	4 5
4549 Dry Creek	265	3,380		Orhy Cemo	410		Orhy Cemo
Pinyon-Juniper			42	2 2		55	10 5
Mountain Shrub			55	1 4		70	10 10

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5002 Dedication Site	100	1,575		Hija Atca	100		Hija Atca
Pinyon-Juniper			31	10 19		31	10 19
5003 Selig Canal	725	2,565		Stco Atri-plex	635		Stco Atri-Plex
Pinyon-Juniper			30	27 3		30	20 3
				Orhy			Orhy
Saltbush			12	T 30		10	T 20
				Feid Artr			Feid Artr
Mountain Shrub			56	18 23		50	10 15
5008 Brush Point	1,755	4,625		Hija Atco	1,450		Hija Atco
Pinyon-Juniper			30	10 15		25	10 10
Saltbush			20	15 25		10	10 20
Barren			0	- -		-	- -
5010 Dead Horse	200	850		Brin Cemo	135		Brin Cemo
Mountain Shrub			83	3 T		70	3 T
Sagebrush			75	T T		65	T T
5011 Gould Reservoir	390	2,510		Orhy Amal	315		Orhy Amal
Mountain Shrub			68	T 14		65	T 10
Sagebrush			41	T 7		35	T 7
5012 Cedar Point	80	405		Orhy Amal	70		Orhy Amal
Pinyon-Juniper			55	1 15		55	1 15
Mountain Shrub			70	T 10		65	T 10
Sagebrush			80	1 10		70	1 10
5013 Iron Canyon	135	1,115		Orhy Arno	110		Orhy Arno
Pinyon-Juniper			48	T 23		45	T 20
				Amal			Amal
Mountain Shrub			68	T 14		60	T 10
Sagebrush			41	T 7		40	T 7
5014 Poison Spring	145	1,155		Orhy Arno	145		Orhy Arno
Pinyon-Juniper			48	T 6		48	T 6
Mountain Shrub			65	T 14		65	T 14
Sagebrush			63	T 14		63	T 14
5015 Grizzly Gulch	260	1,715		Orhy Amal	260		Orhy Amal
Mountain Shrub			65	T 20		65	T 20
Sagebrush			41	T 5		41	T 5
5016 Black Canyon	45	390		Kocr Amal	45		Kocr Amal
Mountain Shrub			80	10 19		70	10 15
Sagebrush			40	5 10		40	5 10
5017 Green Mountain	2,825	10,560		Kocr Orhy Amal Atca	2,245		Kocr Orhy Amal Atca
Pinyon-Juniper			40	- T - 1		35	- T - 1
Mountain Shrub			55	24 - 20 -		50	20 - 10 -
Sagebrush			42	20 5 5 -		35	15 5 5 -

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5020 Black Ridge	605	4,155		Orhy Artr Atca	550		Orhy Artr Atca
Pinyon-Juniper			44	2 - T		40	2 - T
Sagebrush			28	T 40 -		25	T 30 -
5022 Rabbit Gulch	70	300		Orhy Arno Atca	70		Orhy Arno Atca
Pinyon-Juniper			45	4 - T		45	4 - T
Sagebrush			38	T 13 -		38	T 13 -
5025 Fruitland Mesa	5	50		Hija Artr	5		Hija Artr
Pinyon-Juniper			50	5 20		50	5 20
5026 Star Nelson Airport	5	15		Sihy Atco	5		Sihy Atco
Saltbush			15	2 5		15	2 5
5027 Adobe	30	335		Orhy Pera	30		Orhy Pera
Pinyon-Juniper			63	5 38		63	5 38
Sagebrush			55	5 10		55	5 10
5028 Doug Creek	70	445		Orhy Pera	65		Orhy Pera
Pinyon-Juniper			63	5 38		60	5 35
5029 Spring Gulch	150	480		Brin Cemo	140		Brin Cemo
Mountain Shrub			83	5 T		80	5 T
Sagebrush			75	T T		70	T T
Conifer			85	- -		85	- -
Broadleaf Trees			76	- -		76	- -
5030 Bostwick Park	380	750		Orhy Atco Artr	350		Orhy Atco Artr
Pinyon-Juniper			40	3 - 3		35	3 - 3
Saltbush			30	- 20 -		20	- 20 -
Mountain Shrub			60	5 - 5		55	5 - 5
5033 Pinyon Springs	160	860		Agsm Amal	160		Agsm Amal
Pinyon-Juniper			45	4 4		45	4 4
Mountain Shrub			63	T 29		63	T 29
5036 Big Gulch	5	25		Spcr Atco	5		Spcr Atco
Desert Shrub			11	2 18		11	2 18
5037 Black Mesa	0*	0		Spcr Atco	0*		Spcr Atco
Mountain Shrub			-	- -		-	- -
Conifer			-	- -		-	- -
5038 Red Canyon	5	55		Hija Artr	5		Hija Artr
Pinyon-Juniper			50	5 20		50	5 20
5039 Onion Valley	20	35		Stvi Amal	20		Stvi Amal
Mountain Shrub			55	20 25		55	20 25
5040 Pine Ridge	15	70		Stvi Amal	15		Stvi Amal
Mountain Shrub			50	15 25		50	15 25
Broadleaf Trees			80	15 -		80	15 -

* This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5041 East Gould Reservoir	40	530		Agsm Artr	35		Agsm Artr
Sagebrush			39	3 74		35	3 74
5043 Collins	15	305		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			55	T 15		55	T 15
5044 Big Pasture	20	220		Orhy Cemo	20		Orhy Cemo
Pinyon-Juniper			55	T 15		55	T 15
				Artr			Artr
Sagebrush			45	T 40		45	T 40
5045 Black Bullet	5	55		Hija Artr	5		Hija Artr
Pinyon-Juniper			55	5 20		55	5 20
5046 Big Gulch	35	190		Agsm Atca	35		Agsm Atca
Pinyon-Juniper			45	5 10		45	5 10
Desert Shrub			11	5 10		11	5 10
5047 Mesa Creek	75	115		Stvi Amal	75		Stvi Amal
Mountain Shrub			75	10 15		75	10 15
Conifer			80	10 10		80	10 10
5048 Morrow Point	40	60		Stvi Amal	40		Stvi Amal
Mountain Shrub			75	10 15		75	10 15
Conifer			80	10 10		80	10 10
5049 Smith Fork	30	255		Orhy Artr	25		Orhy Artr
Pinyon-Juniper			45	4 13		40	4 13
5050 Allen Reservoir	30	220		Orhy Pera	30		Orhy Pera
Pinyon-Juniper			63	5 38		63	5 38
Sagebrush			55	T 10		55	T 10
5502 Sandy Wash	940	6,275		Hija Atca	805		Hija Atca
Pinyon-Juniper			51	12 5		45	12 5
Waste			43	31 2		35	20 2
5503 Green	50	375		Orhy Atca	40		Orhy Atca
Pinyon-Juniper			25	4 1		25	2 1
5504 Roatcap	350	2,560		Hija Atca	280		Hija Atca
Pinyon-Juniper			25	20 1		25	15 1
Sagebrush			30	10 1		25	5 1
				Orhy			Orhy
Grass			60	15 5		45	10 5
5505 Transfer	300	2,475		Orhy Cemo	205		Orhy Cemo
Pinyon-Juniper			51	10 1		45	6 1
				Arno			Arno
Waste			43	T 9		35	T 9
5507 Pipeline	2,270	15,990		Orhy Cemo	1,950		Orhy Cemo
Pinyon-Juniper			44	5 2		40	5 2
				Hija Artr			Hija Artr
Halfshrub			59	37 2		50	20 2

TABLE 8-16

CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5508 Government Springs	180	1,885		Orhy Cemo	150		Orhy Cemo
Pinyon-Juniper			40	15 1		36	15 1
5509 Coal Creek	50	265		Hija Bogr	50		Hija Bogr
Halfshrub			59	37 31		59	37 31
5510 Bald Hills	25	170		Kocr Amal	25		Kocr Amal
Mountain Shrub			80	5 15		80	5 15
Sagebrush			65	5 5		65	5 5
5511 Shavano Mesa	200	1,630		Hija Atca	140		Hija Atca
Pinyon-Juniper			35	15 T		30	15 T
Sagebrush			45	15 T		40	15 T
Halfshrub			65	10 T		55	10 T
5512 Franklin Mesa	355	3,000		Hija Artr	335		Hija Artr
Pinyon-Juniper			35	15 10		35	15 10
Sagebrush			40	10 25		35	10 25
Grass			40	10 25		35	10 25
5513 Dry Creek Basin	410	4,520		Orhy Artr	395		Orhy Artr
Pinyon-Juniper			57	9 28		55	8 25
Sagebrush			45	T 30		40	T 30
5514 East Fork Dry Creek	15	115		Orhy Amal	15		Orhy Amal
Pinyon-Juniper			60	10 5		60	10 5
Mountain Shrub			90	15 20 Artr		90	15 20 Artr
Sagebrush			60	15 20		60	15 20
Broadleaf Trees			75	- -		75	- -
5515 Olathe Reservoir	15	155		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			57	7 9		57	7 9
Mountain Shrub			90	15 15		90	15 15
5516 Piney	800	6,945		Orhy Amal	1,110		Orhy Amal
Mountain Shrub			40	10 20 Artr		55	10 20 Artr
Sagebrush			35	5 35		45	10 40
5517 Spring Creek Canyon	35	370		Orhy Artr	35		Orhy Artr
Pinyon-Juniper			35	T 3		35	T 3
5518 Dave Wood	215	2,140		Orhy Cemo	195		Orhy Cemo
Pinyon-Juniper			55	T 10 Artr		50	T 10 Artr
Sagebrush			50	T 35		50	T 35

TABLE 8-16

CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5520 Lower Horsefly	965	5,710		Orhy Atco Cemo	870		Orhy Atco Cemo
Pinyon-Juniper			63	6 - 13		55	6 - 10
Saltbush			42	2 43 -		40	2 40 -
Sagebrush			53	4 28 -		45	4 25 -
5521 Highway 90	445	5,185		Orhy Atca	685		Orhy Atca
Pinyon-Juniper			50	2 2		65	10 10
5522 Beaver Hill	1,570	16,485		Orhy Atca	1,320		Orhy Atca
Pinyon-Juniper			50	5 5		45	5 3
5523 Horsefly	55	470		Kocr Cemo	40		Kocr Cemo
Pinyon-Juniper			36	7 3		32	7 3
5524 Duckett Draw	15	230		Hija Sihy Atca Artr	15		Hija Sihy Atca Artr
Pinyon-Juniper			45	- 16 - 27		45	- 16 - 27
Sagebrush			24	29 - T -		24	29 - T -
5525 Dry Creek	15	85		Spcr Artr	15		Spcr Artr
Pinyon-Juniper			35	10 10		35	10 10
Grass			20	20 -		20	20 -
5529 Log Hill	310	3,395		Orhy Amal	235		Orhy Amal
Pinyon-Juniper			75	5 5		60	5 5
Mountain Shrub			70	10 15		65	10 10
5530 Billy Creek	265	1,480		Hija Orhy Cemo Atco	240		Hija Orhy Cemo Atca
Pinyon-Juniper			46	5 T T -		45	5 T T -
Saltbush			42	- 5 - 33		40	- 5 - 33
Mountain Shrub			63	- T 2 -		55	- T 2 -
Sagebrush			45	5 5 - 10		40	5 5 - 10
Grass			60	5 10 2 2		55	5 10 2 2
5532 Burro Ridge	20	165		Orhy Artr	15		Orhy Artr
Pinyon-Juniper			45	T 10		40	T 5
Mountain Shrub			63	T 10		60	T 10
Sagebrush			45	5 30		40	5 25
5533 Onion Lakes	35	410		Brin Cemo	35		Brin Cemo
Mountain Shrub			63	3 2		63	3 2
Conifer			61	3 -		61	3 -
5534 Shin Park	300	510		Orhy Atco	185		Orhy Atco
Pinyon-Juniper			52	10 5		40	5 5
Saltbush			30	3 13		20	3 10
5535 Cedar Creek	10	30		Orhy Amal	10		Orhy Amal
Pinyon-Juniper			45	10 5 Atco		45	10 5 Atco
Saltbush			30	3 15		30	3 15
5536 South Canal	120	275		Orhy Atco	120		Orhy Atco
Saltbush			30	3 13		30	3 13
5538 Rock Ditch	5	5		Orhy Atco	5		Orhy Atco
Saltbush			30	3 13		30	3 13

TABLE 8-16

CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5540 Dry Gulch	930	4,050		Agsm Atca	900		Agsm Atca
Pinyon-Juniper			26	13 T		26	10 T
Mountain Shrub			60	15 T		50	15 T
Sagebrush			25	26 1		25	20 1
Broadleaf Trees			65	20 1		60	15 1
5542 Bosgal	5	5		Orhy Atco	5		Orhy Atco
Saltbush			20	10 30		20	10 30
5543 Waugh	10	25		Agsm Atco	10		Agsm Atco
Pinyon-Juniper			35	10 5		35	10 5
Saltbush			20	5 70		20	5 70
5544 Kelly	5	10		Agsm Atco	5		Agsm Atco
Saltbush			45	8 50		45	8 50
5545 Henshaw	15	20		Sihy Artr	15		Sihy Artr
Pinyon-Juniper			50	10 10		50	10 10
Sagebrush			48	10 30		48	10 30
5546 Waterdog Basin	45	290		Orhy Amal	40		Orhy Amal
Pinyon-Juniper			63	5 2 Artr		55	5 2 Artr
Sagebrush			45	10 25		45	10 20
5547 Slagle Pass	40	260		Brin Viam	40		Brin Viam
Conifer			61	5 11		61	5 11
5548 Washboard Rock	55	260		Orhy Amal	55		Orhy Amal
Mountain Shrub			55	10 15 Brin Viam		55	10 15 Brin Viam
Conifer			61	5 11 Feth		61	5 11 Feth
Grass			85	45 - Brin Agropyron		85	45 - Brin Agropyron
Broadleaf Trees			99	10 5		99	10 5
5549 High Park	110	650		Stco Artr	110		Stco Artr
Sagebrush			65	5 14		65	5 14
Barren			0	- -		0	- -
Conifer			61	5 11 Brin Viam		61	5 11 Brin Viam
Grass			87	24 - Feth		87	24 - Feth
5551 Dexter Creek	5	55		Orhy Amal	5		Orhy Amal
Mountain Shrub			50	5 10		50	5 10
5552 Dallas	15	200		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			45	2 24 Artr		45	2 24 Artr
Sagebrush			40	1 22		40	1 22

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5553 Fisher Creek	40	400		Agsm Cemo	35		Agsm Cemo
Pinyon-Juniper			45	T 20		40	T 15
				Arno			Arno
Mountain Shrub			59	5 20		55	5 15
5555 Taylor Draw	25	270		Sihy Amal	25		Sihy Amal
Pinyon-Juniper			64	3 3		64	3 3
5556 Burro Creek	10	100		Orhy Amal	10		Orhy Amal
Pinyon-Juniper			60	5 3		60	5 3
5557 Alkali	40	405		Orhy Cemo	35		Orhy Cemo
Pinyon-Juniper			55	5 10		50	5 8
Sagebrush			50	5 T		45	2 T
5559 South Fork	15	100		Orhy Cemo	15		Orhy Cemo
Pinyon-Juniper			45	2 24		45	2 24
Sagebrush			45	5 10		45	5 10
5560 Cookie Tree	50	535		Orhy Cemo	45		Orhy Cemo
Pinyon-Juniper			45	2 20		40	2 15
Sagebrush			45	2 5		40	2 5
5561 East Fork	5	65		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			38	13 3		38	13 3
Mountain Shrub			45	5 3		45	5 3
5562 Hillside	10	135		Stco Amal	10		Stco Amal
Pinyon-Juniper			52	T 5		45	T 5
Mountain Shrub			60	1 10		55	1 10
Sagebrush			45	2 2		45	2 2
5563 Moonshine Park	10	175		Brin Amal	10		Brin Amal
Mountain Shrub			53	10 20		53	10 20
Conifer			65	5 5		65	5 5
Grass			73	35 -		73	35 -
Broadleaf Trees			97	18 5		97	18 5
5564 Gravel Pit	5	35		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			43	T 5		45	T 5
5565 Tommy Creek	20	100		Sihy Amal	20		Sihy Amal
Pinyon-Juniper			64	3 3		64	3 3
				Atco			Atco
Desert Shrub			45	10 20		45	10 20
				Amal			Amal
Mountain Shrub			71	8 10		71	8 10
5566 Cow Creek	105	435		Orhy Amal	105		Orhy Amal
Mountain Shrub			73	1 11		73	1 11
Conifer			70	1 3		70	1 3
Broadleaf Trees			80	T 2		80	T 2
5567 Busted Boiler	5	35		Orhy Cemo	5		Orhy Cemo
Pinyon-Juniper			75	10 5		75	10 5

TABLE 8-16
CUSTODIAL MANAGEMENT ALTERNATIVE: PREDICTED VEGETATIVE PRODUCTION, DENSITY, AND COMPOSITION COMPARED WITH PRESENT AND POTENTIAL PRODUCTION, PRESENT DENSITY, AND PRESENT COMPOSITION (Cont.)

Allotments & Veg. Types	Present Prod. a/ (AUMs)	Potential Prod. a/ (AUMs)	Present Veg. Dens. b/ (%)	Present Key Species Composition c/ (%)	Predicted Production (by 2006) a/ (AUMs)	Predicted Veg. Dens. b/ (by 2006) (%)	Predicted Key Species Composition (by 2006) c/ (%)
5568 Baldy	135	565		Stco Amal	135		Stco Amal
Mountain Shrub			52	T 5		52	T 5
				Brin			Brin
Conifer			60	5 2		60	5 2
Grass			55	20 -		55	20 -
5569 Hairpin	30	65		Orhy Cemo	25		Orhy Cemo
Sagebrush			54	4 4		45	4 4
5570 Cedar	375	1,770		Sihy Stco Agsm Amal	340		Sihy Stco Agsm Amal
Pinyon-Juniper			24	13 - T 4		20	10 - T 4
Mountain Shrub			33	2 T 2 2		30	2 T 2 2
Sagebrush			44	- 7 2 4		40	- 7 2 4
5572 McKenzie Creek	10	20		Orhy Cemo	10		Orhy Cemo
Pinyon-Juniper			61	8 3		61	8 3
5574 Tappan Creek	20	200		Sihy Artr	20		Sihy Artr
Pinyon-Juniper			31	3 68		31	3 68
TOTAL	51,315	323,880			46,845		

LIST OF KEY VEGETATIVE SPECIES
AND SCIENTIFIC ABBREVIATIONS

Species Abbreviation	Species Name	Common Name
GRASSES		
Agin	Agropyron intermedium	Intermediate wheatgrass
Agcr	Agropyron cristatum	Crested wheatgrass
Agsm	Agropyron smithii	Western wheatgrass
Agtr	Agropyron trachycaulum	Slender wheatgrass
Bogr	Bouteloua gracilis	Blue grama
Brin	Bromus inermis	Smooth brome
Feid	Festuca idahoensis	Idaho fescue
Feth	Festuca thurberi	Thurber fescue
Hija	Hilaria jamesii	Galleta grass
Kocr	Koeleria cristata	Junegrass
Orhy	Oryzopsis hymenoides	Indian ricegrass
Popr	Poa pratensis	Kentucky bluegrass
Pose	Poa secunda	Sandberg bluegrass
Sihy	Sitanion hystrix	Bottlebrush squirreltail
Spcr	Sporobolus cryptandrus	Sand dropseed
Stco	Stipa comata	Needle-and-thread
Stvi	Stipa viridula	Green needlegrass
FORBS		
Basa	Balsamorhiza sagittata	Arrowleaf balsamroot
Viam	Vicia americana	American vetch
SHRUBS		
Amal	Amelanchier alnifolia	Common serviceberry
Arno	Artemisia nova	Black sagebrush
Artr	Artemisia tridentata	Big sagebrush
Atca	Atriplex canescens	Fourwing saltbush
Atco	Atriplex confertifolia	Shadscale
Atcr	Atriplex corrugata	Mat saltbush
Atnu	Atriplex nuttalli	Nuttall saltbush
Cemo	Cercocarpus montanus	Mountain mahogany
Epvi	Ephedra viridis	Mormon tea
Pera	Peraphyllum ramosissimum	Squaw apple
Putr	Purshia tridentata	Bitterbrush
Syor	Symphoricarpos oreophilus	Mountain snowberry

bottoms. As a result, riparian habitat conditions would decline as follows. Riparian habitats in excellent condition would decrease 2.0 miles to 10.4 total miles, habitats in good condition would decrease 13.0 miles to 32.4 total miles, and habitats in fair condition would increase 5.9 miles to 62.4 total miles. A corresponding increase of 9.1 miles would result for riparian habitats in poor and nonexistent condition.

Heavy grazing and trampling would increase stream bank erosion, cover for fish would be lost, increased water temperatures would eliminate trout in some areas, and an increase in sediments and turbidity would limit stream productivity.

Cultural Resources

Implementing actions initiated under Alternative C would result in adverse impacts to cultural resources. Compliance procedures as outlined in chapter 4 would be followed to mitigate potential adverse impacts.

Visual Resources

Under custodial management, the visual aspects of the range would remain about the same as they are at present. Only a few range improvement facilities would be built. Any discordant impacts would be mitigated or would not be significant.

Recreation

Implementation of this alternative would be expected to result in a reduction of harvestable numbers of deer and elk (see Wildlife). Although total hunter days would not be substantially reduced, hunter success ratios may be decreased, thus providing less opportunity for satisfying consumptive and nonconsumptive wildlife use demands (see Socio-Economic). Specific numbers and percentage changes for hunter days and success ratios have not been calculated here in anticipation of DOW concurrent management control measures.

Agriculture: Livestock Grazing

With this alternative, active licensed use would be initially reduced from 35,369 AUMs to 34,193 AUMs, a reduction of 1,176 AUMs. By 2006, as vegetative productivity increases on AMP allotments and decreases on some of the others where current range trends project decreases, the total ES area livestock use would be 34,040 AUMs, a reduction of 1,329 AUMs from the present active licensed use. Refer to table 8-17 for a listing by allotment of the estimated future use. (It should be noted that some deviation from the use levels shown can be expected, depending on the extent to which individual operators adopt more intensive management systems or construct improvements on their own.)

Socio-Economic Conditions

POPULATION

Adoption of Alternative C would not affect ongoing population trends.

INCOME

Since active licensed use would decrease immediately to 34,193 AUMs, there would be a reduction of 1,176 AUMs from the 1975 level (35,369 − 34,193 = 1,176). This would reduce direct livestock-related income (in 1970 dollars) by $3,410.40 (1,176 × $2.90 = $3,410.40) and, with the livestock income multiplier of (1.487), total direct and indirect livestock-related income would be reduced by $5,071.26 (3,410.40 × 1.487 = $5,071.26). This reduction of $5,071.26, while having an impact on certain operators, would be insignificant when compared with 1974 ES area total direct and indirect range livestock-related income of $6,515,023 and total personal income of $155,345,000.

In the long term, AUM active licensed use would decrease until in the year 2006 it is expected to be 34,040, which would be a reduction of 1,329 AUMs from the 1975 level. This would amount to a long-term income reduction of $3,854.10 (1,329 × $2.90 = $3,854.10) in direct livestock-related income and $5,731.05 ($3,854.10 × 1.487 = $5,731.05) in total direct and indirect livestock-related income. As in the short term, this reduction in income would be insignificant when compared with area livestock-related income.

However, along with this income decrease, some realignment of incomes could occur with both negative and positive income effects being experienced by some individual operators. Some increases or decreases in licensed active use would be dependent on management practices of individual operators and would result in direct income changes at the rate of $2.90 (1970 dollars) per unit change in AUM use. Internal realignment of indirect income could also occur to the extent that individual operators experiencing direct income changes do business with different supply outlets, trucking and marketing firms, etc.

TABLE 8-17
ALTERNATIVE C: CUSTODIAL MANAGEMENT
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
4001 Dominguez	5,600	1,833	1,833	4,320	1,833
4002 Lower Escalante	335	300	300	280	280
4005 Fall Cabin	40	18	18	40	18
4006 Dry Mesa	1,185	883	665	1,585	876
4007 Sawmill Mesa	790	536	341	1,210	600
4008 25 Mesa	810	644	773	985	644
4010 Monitor Mesa	1,435	1,174	1,174	1,300	1,173
4011 Lower Roubideau Canyon	45	89	27	10	10
4012 Canal	1,000	831	831	1,220	822
4013 Ben Lowe	570	446	446	755	432
4014 Joker	115	87	87	150	87
5015 White Ranch	25	10	10	35	10
4016 Wells Gulch	2,680	2,380	2,380	2,680	2,366
4017 Alkali Flats	3,560	2,651	2,651	2,780	2,651
4021 Point Creek	115	0	101	95	77
4022 Petrie Mesa	1,430	1,258	1,258	1,090	1,258
4024 Dirty George	300	236	236	200	200
4025 Ward Creek-Doughspoon	700	441	441	650	441
4026 Escalante Canyon	40	20	20	40	20
4501 Milk Creek	15	16	16	15	15
4502 Surface to Leroux Creek	495	443	443	655	418
4503 Stingley Gulch	125	98	98	150	98
4504 Leroux Creek	195	249	190	140	140
4505 Juniper Knob	10	0	10	10	4
4506 Oak Mesa	95	64	64	80	64
4507 Jay Creek	1,030	879	879	800	800
4509 Upper Jay Creek	75	94	66	50	50
4511 Overland	20	29	14	20	14
4512 East Roatcap	10	68	10	10	10
4513 Stevens Gulch	865	694	694	650	650
4514 Upper Terror Creek	5	17	3	5	3
4515 Freeman Gulch	70	53	53	70	53
4516 North Fork	2,630	1,079	1,079	2,165	1,079
4517 Coal Gulch	770	484	484	595	484
4518 Pilot Creek	40	38	33	40	33
4519 Muddy Creek	25	16	16	25	16
4520 Spring Creek	30	26	25	30	26
4521 Stock Driveway	10	6	6	10	5
4522 Downing	30	22	24	30	22
4523 Williams Creek	10	8	8	10	8
4524 Deep Creek	10	3	3	10	3
4525 Anthracite Creek	170	118	118	125	117
4526 Crystal Creek	60	51	51	60	50
4527 Jumbo Mountain	700	413	413	555	413
4528 Oak Ridge	335	210	238	400	244
4529 Reynolds Creek	190	158	158	210	159
4530 McDonald Mesa	205	100	122	310	122
4531 Popp Ranch	15	8	4	15	4
4532 McDonald Ranch	725	536	536	585	536
4535 Home Place	15	15	15	15	15
4536 West Young's Peak	10	6	6	10	6
4537 Young's Peak	240	171	135	280	175
4538 Missouri Flats	5	4	4	5	4
4539 Cottonwood Creek	10	10	8	10	10
4540 North Saddle Peak	40	31	31	30	30
4541 Sunshine Mesa	5	5	5	0	0
4543 South Saddle Peak	20	13	13	20	13
4548 Creek Bottom	10	5	5	10	5
4549 Dry Creek	265	135	193	410	183
5002 Dedication Site	100	213	44	100	44
5003 Selig Canal	725	330	330	635	330

TABLE 8-17
ALTERNATIVE C: CUSTODIAL MANAGEMENT
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)(Cont.)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
5008 Brush Point	1,755	1,123	1,123	1,450	1,123
5010 Dead Horse	200	171	171	135	135
5011 Gould Reservoir	390	305	305	315	305
5012 Cedar Point	80	55	55	70	55
5013 Iron Canyon	135	95	95	110	95
5014 Poison Spring	145	99	99	145	99
5015 Grizzly Gulch	260	349	230	260	230
5016 Black Canyon	45	82	45	45	45
5017 Green Mountain	2,825	1,647	1,647	2,245	1,647
5020 Black Ridge	605	400	400	550	400
5022 Rabbit Gulch	70	35	35	70	35
5025 Fruitland Mesa	5	2	2	5	2
5026 Star Nelson Airport	5	11	5	5	5
5027 Adobe	30	24	24	30	24
5028 Doug Creek	70	60	60	65	60
5029 Spring Gulch	150	110	110	140	110
5030 Bostwick Park	380	188	188	350	188
5033 Pinyon Springs	160	132	131	160	131
5036 Big Gulch	5	5	5	5	5
5037 Black Mesa	0	6	0	0	0
5038 Red Canyon	5	3	3	5	2
5039 Onion Valley	20	17	17	20	17
5040 Pine Ridge	15	14	14	15	14
5041 East Gould Reservoir	40	20	20	35	20
5043 Collins	15	10	10	15	10
5044 Big Pasture	20	15	15	20	15
5045 Black Bullet	5	3	3	5	3
5046 Big Gulch	35	0	35	35	35
5047 Mesa Creek	75	23	55	75	23
5048 Morrow Point	40	8	8	40	8
5049 Smith Fork	30	19	19	25	19
5050 Allen Reservoir	30	23	24	30	23
5502 Sandy Wash	940	707	707	805	707
5503 Green	50	39	39	40	39
5504 Roatcap	350	264	264	280	264
5505 Transfer	300	214	214	205	205
5507 Pipeline	2,270	1,715	1,715	1,950	1,715
5508 Government Springs	180	125	125	150	125
5509 Coal Creek	50	44	44	50	44
5510 Bald Hills	25	21	21	25	21
5511 Shavano Mesa	200	261	200	140	140
5512 Franklin Mesa	355	363	350	335	335
5513 Dry Creek Basin	410	440	300	395	300
5514 East Fork Dry Creek	15	11	11	15	11
5515 Olathe Reservoir	15	18	17	15	15
5516 Piney	800	557	557	1,110	557
5517 Spring Creek Canyon	35	52	35	35	35
5518 Dave Wood	215	176	176	195	176
5520 Lower Horsefly	965	665	665	870	665
5521 Highway 90	445	265	265	685	313
5522 Beaver Hill	1,570	1,022	1,022	1,320	1,022
5523 Horsefly	55	38	38	40	37
5524 Ducket Draw	15	20	6	15	5
5525 Dry Creek	15	15	9	15	15
5529 Log Hill	310	189	189	235	189
5530 Billy Creek	265	150	150	240	150
5532 Burro Ridge	20	15	15	15	15

TABLE 8-17
ALTERNATIVE C: CUSTODIAL MANAGEMENT
PRESENT PRODUCTION AND PRESENT ACTIVE LICENSED USE
COMPARED WITH PREDICTED FUTURE PRODUCTION AND USE (BY 2006)(Cont.)

Allotment Number & Name	Present Production (AUMs)	Present Active Licensed Use (AUMs)	Proposed Alternative Use (AUMs)	Predicted Production (By 2006) (AUMs)	Predicted Use (By 2006) (AUMs)
5533 Onion Lakes	35	15	15	35	15
5534 Shin Park	300	251	251	185	185
5535 Cedar Creek	10	6	6	10	6
5536 South Canal	120	60	57	120	57
5538 Rock Ditch	5	9	5	5	5
5540 Dry Gulch	930	808	808	900	797
5542 Bosgal	5	9	5	5	5
5543 Waugh	10	30	10	10	10
5544 Kelly	5	2	2	5	2
5545 Henshaw	15	12	12	15	12
5546 Waterdog Basin	45	35	35	40	34
5547 Slagle Pass	40	30	30	40	30
5548 Washboard Rock	55	34	34	55	34
5549 High Park	110	61	61	110	61
5551 Dexter Creek	5	3	3	5	3
5552 Dallas	15	24	0	15	0
5553 Fisher Creek	40	34	0	35	0
5555 Taylor Draw	25	55	0	25	0
5556 Burro Creek	10	15	0	10	0
5557 Alkali	40	20	0	35	0
5559 South Fork	15	12	0	15	0
5560 Cookie Tree	50	57	0	45	0
5561 East Fork	5	14	5	5	5
5562 Hillside	10	40	10	10	10
5563 Moonshine Park	10	7	7	10	7
5564 Gravel Pit	5	4	4	5	4
5565 Tommy Creek	20	18	3	20	18
5566 Cow Creek	105	70	70	105	70
5567 Busted Boiler	5	2	2	5	2
5568 Baldy	135	88	88	135	88
5569 Hairpin	30	18	18	25	18
5570 Cedar	375	315	315	340	315
5572 McKenzie Creek	10	5	0	10	0
5574 Tappan Creek	20	11	11	20	11
TOTALS	51,315	35,369	34,193	46,845	34,040

Since permittees would be allowed to construct new range improvements with BLM approval, it is expected some construction of this type would occur on a small scale since it would be economically beneficial to NRL users. This would add to area income by an undetermined amount, as would the maintenance of any such range improvements.

A reduction of 10 to 20 percent of all big game species using NRL could be expected, which could have an impact on area income generated from hunters' expenditures. These percentage reductions would amount to decreases of 25 to 50 animals for antelope, 1,500 to 3,000 for deer, and 120 to 240 for elk. Translated into possible decreases of expenditures in the area by hunters, these big game population reductions would amount to an estimated decrease in expenditures of between $161,258 and $322,239 (in 1973 dollars). (See appendix 10.) It is likely that about 20 percent of these expenditures would result in area income, which would mean an estimated loss between $32,252 and $64,448.

Government-related income in the ES area could be slightly reduced by the amount of salary reductions necessary to bring BLM employees' salaries in line with lower skill duty requirements.

EMPLOYMENT

A minor loss of employment is possible if this alternative is adopted. Some loss of an indeterminant nature could occur in range livestock-related activities and loss of income resulting from big game population decreases could reduce employment by about 2.69 to 5.38 man-years annually.

The net loss of employment, although slight in magnitude, would contribute to the relative income deficient status of the area. Although the impact on the area would be insignificant, individual ranchers experiencing use reductions and those whose jobs are dependent on hunting and other recreation spending would be adversely affected.

SOCIAL WELL-BEING

The general well-being of the ES area would not be affected by this alternative. However, some individual livestock operators could be adversely influenced due to a loss of income and paper value of certain ranches.

PUBLIC FINANCE AND TAX BASE

The area tax base would be slightly affected since allowable AUMs (active use qualification) would decrease from 40,705 to 40,479 when this alternative is initiated. This 226 AUM reduction would reduce the carrying capacity of area ranches by 18.83 animal units, which would reduce the paper value of those ranches affected by the reduction by about $18,830. Since Colorado properties are assessed at about 30 percent of market value, the reduction in ranch value would amount to a $5,649 reduction in the area tax base. The tax base reduction would be 0.007 percent of the 1975 ES area assessed valuation.

Since Colorado agricultural land prices reflect demand influences for land for considerations other than future ranch income, it is acknowledged that ES area ranches would appreciate. However, values of ranch property with decreased present value could be expected to appreciate at a slower rate than those similar properties experiencing no decreased carrying capacity. To assess the impact of decreased carrying capacity on individual operators, decreases in allowable licensed grazing levels would have to be viewed on an individual operator by operator basis.

SOCIO-CULTURAL ATTITUDES

This alternative would be relatively inoffensive to local socio-cultural attitudes since local self-deterministic options would be preserved and any realignment of operator use would be minimal. However, there would be an adverse reaction from area residents in general since there would be a lack of commitment to range improvement and continued economic growth.

The alternative would likely receive praise from some local and national groups who would appreciate its lessening of government interference in local affairs. However, other groups would find it inadequate in its enhancement and protection of resource values.

ALTERNATIVE D: REDUCED LIVESTOCK GRAZING

Description

Alternative D, Reduced Livestock Grazing, would have the following components (as summarized in tables 8-18 and 8-19).

1. AMPs with rest rotation grazing systems would be implemented on 48 allotments and 15 allotment subunits (totaling 446,410 acres NRL), with the following additional stipulations:

a. livestock grazing on 36 allotments and 7 allotment subunits (marked with an asterisk in table 8-18) in deer, elk, or antelope crucial areas would be reduced 30 percent (affecting 371,830 acres);

b. sheep winter use would be changed to cattle winter use on 2 of those 36 allotments, 4016 Wells Gulch and 4017 Alkali Flats (totaling 44,785 acres), which would require 76 miles of fence and eight cattleguards for adequate implementation;

c. the other 34 allotments and 7 allotment subunits (totaling 327,045 acres) would receive three-treatment rest rotation systems with late spring and summer use;

d. livestock grazing on 5030 Bostwick Park, subunit V Adobe South (3,480 acres), would be reduced 50 percent due to the severe watershed condition, and a spring-summer rest rotation system would be implemented.

2. AMPs with deferred rotation systems would be implemented on 5 allotments and 1 allotment subunit (12,385 acres NRL).

3. AMPs with deferred systems would be implemented on 7 allotments and 4 allotment subunits (20,470 acres NRL).

4. Limited (one day each way) trailing use would be implemented on 4011 Lower Roubideau Canyon (480 acres NRL).

5. Custodial management would be implemented on 72 allotments and 5 allotment subunits (29,460 acres NRL), with the following additional stipulations:

a. livestock grazing on 12 allotments and 1 allotment subunit (marked with an asterisk in table 8-18) in deer, elk, or antelope crucial areas would be reduced 30 percent (affecting 7,990 acres NRL);

b. all 12 allotments and 1 allotment subunit in crucial areas would be changed from fall-winter to spring-summer grazing.

6. Future stocking rates for livestock would be adjusted if studies indicate increased wildlife populations.

7. Livestock grazing would be eliminated on the 9 allotments (3,020 acres NRL) listed in table 8-19.

8. Unallotted status (no livestock grazing) would be continued on 45 tracts (13,550 acres NRL).

9. Allotments that have riparian and aquatic communities in degraded condition which are not expected to improve to acceptable conditions would have the AMPs changed to include 24.5 miles of fence to protect 12.25 NRL stream miles, as follows:

a. Monitor Creek, 4014 Joker (6 miles of fence on 3 miles of stream) and 4010 Monitor Mesa (7.5 miles of fence on 3.75 miles of stream);

b. Upper Roubideau Creek, 4012 Canal (5 miles of fence on 2.5 miles of stream);

c. West Fork of Dry Creek, 5516 Piney (6 miles of fence on 3 miles of stream);

d. other areas identified in future stream surveys where riparian and aquatic habitats are declining after AMP implementation would be fenced as above.

Implementation of the AMPs would require the range improvements and vegetation conversions summarized in table 8-20. (These projects include the 24.5 miles of riparian fencing as well as the 76 miles of fence and eight cattleguards for 4016 Wells Gulch and 4017 Alkali Flats mentioned above.) Approximately 400 miles of existing road would also need to be maintained to allow water hauling for summer livestock use.

Design features for these projects would be the same as for those described in chapter 1, with the following additional stipulations:

1. Fences for riparian habitat (item 9 above) would be built with water gaps 50 feet wide, accessible from both sides of the stream, and placed every 0.5 mile;

2. Native species of woody riparian vegetation would be reintroduced into the fenced riparian zones.

As shown in table 8-21, these projects would disturb approximately 30,072 acres during implementation and approximately 25 acres by 2006.

Analysis

Soils

As stated in the water resources section, this alternative would have similar hydrologic impacts as the proposed action except for allotments 4506 Oak Mesa (Subunit G), 5022 Rabbit Gulch, and 5569 Hairpin.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED REST ROTATION GRAZING SYSTEMS					
Two-Treatment					
4006 Dry Mesa:					
A Escalante Subunit	2,280	C-76	11/27-12/31	1	D, E
4516 North Fork:					
K South-of-Hotchkiss Subunit	1,395	S-50	04/16-05/04	2	A, E
L Hubbard Subunit	1,705	S-46	05/10-05/22	2	A, E
5003 Selig Canal:					
S Selig Canal Subunit	5,660	S-378	12/16-01/23	3	D, E
5511 Shavano Mesa	2,015	S-200	12/20-02/06	4	D, E
5512 Franklin Mesa	3,600	S-350	12/16-02/26	1	D, E
Three-Treatment					
4001 Dominguez*	58,335	C-1,448	05/01-08/31	4	A, B, E
4006 Dry Mesa:					
B Dry Mesa Subunit*	16,165	C-342	05/01-08/31	4	A, B, E
4007 Sawmill Mesa*	12,095	C-239	05/01-08/31	1	A, B, E
4008 25 Mesa*	10,405	C-541	05/03-08/31	1	A, B, E
4010 Monitor Mesa*	15,735	C-822	05/16-08/31	3	A, B, E
4012 Canal*	10,650	C-667	05/15-08/31	4	A, B, E
4013 Ben Lowe*	5,490	C-356	05/21-08/31	3	A, B, E
4016 Wells Gulch*	16,955	C-1,656	11/15-04/30	3	A, B, E
4017 Alkali Flats*	27,830	C-1,444	12/01-05/07	4	A, B, E
4022 Petrie Mesa:					
E Peach Valley Subunit	11,035	S-1,156	12/01-04/30	4	A, D, E
4024 Dirty George*	2,385	C-209 (2-yr. avg.)	05/16-08/31	2	A, B, E
4025 Ward Creek-Doughspoon*	17,910	C-380 (3-yr. avg.)	05/11-08/31	4	A, B, E

a/ C = cattle; S = sheep; H = domestic horses; AUM = animal unit month.
b/ Applies only to rest rotation systems. Letters refer to rest rotation treatments A through E discussed in chapter 1, under the components section: A = spring grazing; B = summer grazing; C = fall grazing; D = winter grazing; and E = yearlong rest from livestock grazing.
* Thirty percent reduction in livestock grazing.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Three-Treatment (cont.)					
4503 Stingley Gulch*	1,080	C-69	05/10-08/31	2	A, B, E
4504 Leroux Creek*	2,555	C-175	05/15-08/31	5	A, B, E
4506 Oak Mesa:					
G Subunit 1*	600	S-13	05/01-08/31	2	A, B, E
H Subunit 2*	750	S-18	06/16-08/31	3	A, B, E
4507 Jay Creek*	9,205	C-723	05/16-08/31	5	A, B, E
4513 Stevens Gulch:					
I Roatcap Creek Subunit*	2,120	C-157	05/16-08/31	4	A, B, E
J Terror Creek Subunit*	4,435	C-311	05/16-08/31	5	A, B, E
4516 North Fork:					
M Deer Basin Subunit*	20,320	S-945 (3-yr. avg.)	05/15-08/31	3	A, B, E
4517 Coal Gulch	7,720	S-370	05/01-07/24	2	A, C, E
		C-70	10/01-11/13		
4525 Anthracite Creek*	1,115	C-82	06/04-08/31	4	A, B, E
4527 Jumbo Mountain*	4,970	C-402	05/11-08/31	3	A, B, E
4528 Oak Ridge*	3,600	C-167	05/21-08/31	3	A, B, E
4529 Reynolds Creek*	1,200	C-111	06/15-08/31	2	A, B, E
4530 McDonald Mesa*	3,185	C-85	06/01-08/31	2	A, B, E
4537 Young's Peak:					
Q Young's Peak Subunit*	2,260	C-79	05/15-08/31	1	A, B, E
4540 North Saddle Peak*	240	C-23	06/01-08/31	2	A, B, E
4549 Dry Creek*	3,110	C-132	05/16-08/31	2	A, B, E
5008 Brush Point	18,205	S-1,118	11/14-03/02	3	A, D, E
			04/16-05/06		
		C-32	03/15-05/14		
5010 Dead Horse	955	C-113	05/20-06/19	1	A, C, E
			09/16-10/15		
5011 Gould Reservoir*	2,825	C-142	05/05-08/31	1	A, B, E
5013 Iron Canyon*	1,335	C-44	05/15-08/31	1	A, B, E
5014 Poison Springs*	1,570	C-46	05/15-08/31	1	A, B, E
5015 Grizzly Gulch	1,930	C-230	05/11-05/27	1	A, C, E
			08/16-09/02		
5017 Green Mountain*	20,825	S-715	05/15-08/31	4	A, B, E
		C-447			
5020 Black Ridge*	6,875	S-280	05/15-08/31	4	A, B, E
5028 Doug Creek	400	C-40	05/16-06/15	1	A, C, E
			09/01-09/30		
5030 Bostwick Canyon:					
U Black Canyon-Jones Draw Subunit	1,655	C-60	04/21-05/16	3	A, C, E
			09/15-10/15		
V Adobe South Subunit**	3,480	C-47	05/01-08/31	3	A, B, E

* Thirty percent reduction in livestock grazing.
** Fifty percent reduction in livestock grazing.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
Three-Treatment (cont.)					
5502 Sandy Wash*	7,530	S-495	05/15-08/31	3	A, B, E
5505 Transfer*	2,970	C-150	05/15-08/31	1	A, B, E
5507 Pipeline*	19,190	C-1,092	05/15-08/31	5	A, B, E
5513 Dry Creek Basin*	5,425	S-206	05/15-08/31	1	A, B, E
5516 Piney*	8,335	C-373 H-17	06/01-08/31	5	A, B, E
5521 Highway 90*	6,215	S-230 (6-yr. avg.)	05/01-08/31	6	A, B, E
5522 Beaver Hill*	19,785	S-654	05/16-08/31	5	A, B, E
5529 Log Hill*	4,345	C-107	05/16-08/31	4	A, B, E
5530 Billy Creek*	3,995	C-93 H-2	05/10-08/31	3	A, B, E
5569 Hairpin*	500	S-13	05/16-08/31	2	A, B, E
Four-Treatment					
4021 Point Creek	1,000	S-77	10/15-12/20	1	A, C, E, C
5503 Green	450	C-24	05/30-06/19 10/20-11/12	1	A, C, E, C
5504 Roatcap	3,070	S-195	05/07-06/15 10/16-11/24	1	A, C, E, C
5508 Government Springs	2,260	C-83	05/16-06/15 10/16-11/15	1	A, C, E, C
5520 Lower Horsefly: X Lower Horsefly Subunit	5,675	S-304	05/01-05/12 10/20-11/17	4	A, C, E, C
5523 Horsefly	640	C-15	06/01-07/02 09/15-11/14	1	A, C, E, C
5540 Dry Gulch	4,860	S-795	05/01-06/04 11/01-11/12 12/01-01/30	1	A, C, E, D
SUBTOTALS	446,410	C-13,904 S- 8,608 H- 19 22,531			

* Thirty percent reduction in livestock grazing.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED DEFERRED ROTATION GRAZING SYSTEMS					
4502 Surface to Leroux	3,230	C-443	05/26-06/15 10/16-10/21	2	
4532 McDonald Ranch:					
N Lambing Shed Subunit	4,640	S-246	04/06-05/15 10/06-10/30	2	
5016 Black Canyon	440	C-45	05/11-06/30 10/11-10/30	1	
5029 Spring Gulch	1,430	C-110	06/01-09/20	3	
5566 Cow Creek	520	C-80	06/20-07/30 09/01-09/20	1	
5570 Cedar	2,125	C-236	05/15-06/14 10/17-11/16	2	
		C- 914 S- 246			
SUBTOTALS	12,385	1,160			
PROPOSED DEFERRED GRAZING SYSTEMS					
4002 Lower Escalante	2,240	S-300	01/09-01/30	1	
4022 Petrie Mesa:					
F Petrie Mesa Subunit	2,825	S-102	12/12-01/17	1	
4532 McDonald Ranch:					
O South-of-Town Subunit	2,155	S-246	12/08-01/18	1	
P Harrington Subunit	535	S-47 H-7	12/01-02/28	1	
5049 Smith Fork	450	C-19	11/01-11/06	1	
5518 Dave Wood	2,565	S-144	09/15-10/04	1	
5520 Lower Horsefly:					
Y Dry Cedar Subunit	4,690	S-360	01/01-02/15	1	
5532 Burro Ridge	200	C-15	08/16-09/30	1	
5534 Shin Park	3,970	S-187	12/01-01/15	1	
5562 Hillside	160	C-10	08/15-09/30	1	
5568 Baldy	680	C-67	08/16-09/30	1	
		C- 111 S-1,386 H- 7			
SUBTOTALS	20,470	1,504			

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED TRAILING USE					
4011 Lower Roubideau Canyon	480	C-27	05/15-05/20 10/15-10/20		
SUBTOTALS	480	C-27 27			
PROPOSED CUSTODIAL ALLOTMENTS					
4005 Fall Cabin*	360	C-13	05/01-08/31		
4006 Dry Mesa:					
C Smith Ranch Subunit	150	C-50	04/25-05/31		
D Escalante Creek Subunit	300	C-50	04/25-04/27		
4014 Joker*	1,835	C-61	05/21-08/31		
4015 White Ranch	415	C-10	04/01-05/31 10/16-02/28		
4026 Escalante Canyon	1,270	C-20	01/01-02/07		
4501 Milk Creek	105	C-16	08/15-08/31		
4505 Juniper Knob	120	S-10	05/01-06/05		
4509 Upper Jay Creek*	430	C-47	05/20-08/31		
4511 Overland*	160	C-10	06/16-08/31		
4512 East Roatcap*	30	C-7	06/19-08/31		
4514 Upper Terror Creek	30	C-3	09/15-10/15		
4515 Freeman Gulch*	620	C-37	06/01-08/31		
4518 Pilot Creek	45	S-33	06/16-07/30 10/11-11/12		
4519 Muddy Creek	500	S-16	05/16-06/25		
4520 Spring Creek*	120	C-18	06/12-08/31		
4521 Stock Driveway	120	S-6	06/01-06/06 11/01-11/06		
4522 Downing	120	C-24	05/26-06/17 09/16-09/30		
4523 Williams Creek	110	C-8	05/16-07/15		
4524 Deep Creek	160	C-3	06/01-10/15		
4526 Crystal Creek	480	C-51	05/16-09/30		
4531 Popp Ranch	265	C-4	05/15-06/14		
4535 Home Place	160	C-15	10/07-10/15		
4536 West Young's Peak	160	C-6	05/01-07/31		
4537 Young's Peak:					
R Crawford Subunit	260	C-22	06/17-06/25		
4538 Missouri Flats	120	C-4	06/12-09/15		
4539 Cottonwood Creek	120	C-8	05/20-06/03 09/15-09/29		

* Thirty percent reduction in livestock grazing.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (cont.)					
4541 Sunshine Mesa	40	C-5	05/16-06/15		
4543 South Saddle Peak	220	C-13	06/16-06/20		
			10/10-10/15		
4548 Creek Bottom	185	C-5	06/01-10/15		
5002 Dedication Site	1,915	C-44	03/01-04/06		
5003 Selig Canal:					
T Rawhide-Coffeepot Subunit*	2,005	S-22	05/16-08/31		
5012 Cedar Point*	620	C-38	05/30-08/31		
5022 Rabbit Gulch*	1,250	C-25	05/01-08/31		
5025 Fruitland Mesa	80	S-2	05/01-11/30		
5026 Star Nelson Airport	80	C-5	01/02-02/28		
5027 Adobe	300	C-24	05/15-06/14		
5030 Bostwick Park:					
W Bostwick Park Subunit	360	C-4	05/01-06/15		
5033 Pinyon Springs	1,030	C-131	06/02-10/16		
5036 Big Gulch	40	S-5	11/01-11/30		
5038 Red Canyon*	80	C-2	05/10-08/31		
5039 Onion Valley*	40	C-11	07/01-08/31		
		H-1			
5040 Pine Ridge	80	C-14	06/01-11/15		
5041 East Gould Reservoir	620	C-20	06/06-06/15		
5043 Collins	200	C-10	05/05-06/04		
5044 Big Pasture	200	C-15	05/16-06/15		
5045 Black Bullet	90	H-3	11/01-11/30		
5046 Big Gulch	440	S-35	03/02-04/17		
5047 Mesa Creek	640	C-55	05/01-10/15		
5048 Morrow Point	1,035	C-8	05/20-06/10		
5050 Allen Reservoir	200	C-24	05/16-06/04		
			10/16-10/20		
5509 Coal Creek	320	C-44	05/16-05/30		
			11/08-11/15		
5510 Bald Hills	205	C-21	05/29-06/30		
			10/11-11/09		
5514 East Fork Dry Creek	135	C-11	06/01-10/27		
5515 Olathe Reservoir	185	C-17	05/16-10/15		
5517 Spring Creek Canyon*	440	C-25	05/31-08/31		
5524 Duckett Draw	275	C-6	04/01-05/31		
			11/01-12/31		

* Thirty percent reduction in livestock grazing.

TABLE 8-18
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SUMMARY OF PROPOSED MANAGEMENT BY SYSTEM AND BY ALLOTMENTS (cont.)

Tract	Acres NRL	Class-AUMs a/	Season	Pastures	Treatments b/
PROPOSED CUSTODIAL ALLOTMENTS (cont.)					
5525 Dry Creek	100	C-9	09/20-10/19		
5533 Onion Lakes	630	C-15	10/16-11/30		
5535 Cedar Creek	240	C-6	06/01-06/30		
5536 South Canal	2,115	S-57	01/01-01/17		
5538 Rock Ditch	55	C-5	11/01-11/30		
5542 Bosgal	50	S-5	09/01-02/28		
5543 Waugh	200	S-10	12/16-02/28		
5544 Kelly	80	S-2	11/01-12/15		
5545 Henshaw	170	S-12	10/15-11/15		
5546 Waterdog Basin	400	C-35	03/20-10/30		
5547 Slagle Pass	310	C-30	07/28-09/27		
5548 Washboard Rock	760	S-34	05/16-09/15		
5549 High Park	1,660	S-60	07/01-09/30		
		H-1			
5551 Dexter Creek	65	H-3	06/01-06/21		
5561 East Fork	80	S-3	06/15-07/31		
		H-2	06/15-07/31		
			10/01-10/31		
5563 Moonshine Park	230	C-7	07/01-09/30		
5564 Gravel Pit	40	S-4	10/01-11/08		
5565 Tommy Creek	120	C-3	04/16-06/15		
5567 Busted Boiler	40	C-2	08/01-09/30		
5574 Tappan Creek	240	S-11	04/11-05/10		
			11/15-11/19		
		C-1,176			
		S- 327			
		H- 10			
SUBTOTALS	29,460	1,513			
		C-16,132			
		S-10,567			
		H- 36			
TOTALS	509,205	26,735			

TABLE 8-19
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING
PROPOSED ELIMINATION OF GRAZING

Tract	Acres NRL	AUMs Eliminated
5037 Black Mesa	500	6
5552 Dallas	240	24
5553 Fisher Creek	480	34
5555 Taylor Draw	325	55
5556 Burro Creek	120	15
5557 Alkali	485	20
5559 South Fork	120	12
5560 Cookie Tree	640	55
5572 McKenzie Creek	110	5
TOTALS	3,020	226

TABLE 8-20
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
4001 Dominguez	40.5 mi.	2.5 mi. Trail	35.0 mi.	6	5	-	6	44	7,445 ac. C&S
4002 Lower Escalante	-	-	-	-	-	-	-	4	-
4010 Monitor Mesa	17.5 mi.	0.5 mi. Trail	3.0 mi.	-	2	10 1 Catchment	1	17	2,045 ac. C&S
4012 Canal	5.0 mi.	-	-	-	-	-	-	-	-
4014 Joker	6.0 mi.	-	-	-	-	-	-	-	-
4016 Wells Gulch	38.0 mi. 4 Cattleguards	-	19.5 mi.	2	-	-	2	23	-
4017 Alkali Flats	44.0 mi. 4 Cattleguards	-	2.0 mi. 2 Water Taps	-	-	-	-	4	-
4024 Dirty George	3.0 mi.	1 Stock Bridge	-	-	1	1	-	2	-
4025 Ward Creek-Doughspoon	11.0 mi.	-	11.0 mi.	-	1	-	-	16	900 ac. C&S
4504 Leroux Creek	4.5 mi.	0.5 mi. Trail	2 Water Taps	-	5	4	-	19	310 ac. C&S
4506 Oak Mesa:									
G Subunit 1	1.0 mi.	-	-	-	-	-	-	-	300 ac. C&S
H Subunit 2	1.5 mi.	-	-	-	1	-	-	1	200 ac. C&S
4507 Jay Creek	16.0 mi.	-	7.5 mi.	-	4	3	-	18	2,655 ac. C&S
	1 Corral	-	-	-	-	-	-	-	95 ac. IS
4513 Stevens Gulch:									
I Roatcap Creek Subunit	-	-	-	-	-	-	-	-	160 ac. IS
J Terror Creek Subunit	4.0 mi. 2 Cattleguards	-	0.5 mi.	-	3	4	-	8	860 ac. C&S
4516 North Fork	31 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4517 Coal Gulch	-	-	0.5 mi.	-	1	2	-	4	-
4525 Anthracite Creek	0.5 mi.	-	-	-	2	2	-	5	-
4527 Jumbo Mountain	4.0 mi.	1.0 mi. Trail	1.5 mi.	-	1	5	-	8	660 ac. C&S 400 ac. IS

a/ Key to Vegetation Conversion: C&S = chaining and seeding; IS = interseeding; CF = contour furrowing.

TABLE 8-20
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT (Cont.)

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
4532 McDonald Ranch	58 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4540 North Saddle Peak	0.5 mi.	-	-	-	-	-	-	-	-
5003 Selig Canal:									
S Selig Canal Subunit	-	-	-	-	-	-	-	-	1,510 ac. IS
5008 Brush Point	-	-	1.0 mi.	1	-	-	1	2	2,555 ac. IS
5010 Dead Horse	3.5 mi.	-	-	-	-	-	-	-	-
5011 Gould Reservoir	-	-	-	-	-	5	-	5	-
5013 Iron Canyon	-	-	-	-	-	5	-	5	-
5014 Poison Spring	-	-	-	-	-	2	-	2	-
5015 Grizzly Gulch	4.5 mi.	-	-	-	-	4	-	4	-
5016 Black Canyon	-	-	-	-	-	-	-	-	80 ac. C&S
5017 Green Mountain	5.5 mi.	-	-	-	-	16	-	16	505 ac. C&S
5020 Black Ridge	7.0 mi.	-	6.0 mi.	-	-	3	1	10	800 ac. C&S
5028 Doug Creek	1.5 mi.	-	-	-	-	-	-	-	-
5030 Bostwick Park:									
U Black Canyon-Jones Draw Subunit	2.0 mi.	-	-	-	-	-	2	2	-
V Adobe South Subunit	5.5 mi. 1 Cattleguard	-	-	-	-	-	-	-	820 ac. CF
5502 Sandy Wash	-	-	8.0 mi.	-	-	-	-	8	-
5504 Roatcap	3.0 mi.	-	6.0 mi.	2	-	-	2	8	-
5507 Pipeline	18.0 mi. 4 Cattleguards	-	22.0 mi.	2	-	3	2	30	-
5508 Government Springs	5.0 mi. 2 Cattleguards	1.0 mi. Trail	-	-	-	6	-	6	-

TABLE 8-20
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING
PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT (Cont.)

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
5511 Shavano Mesa	-	-	-	-	-	-	-	-	1,120 ac. IS
5512 Franklin Mesa	-	-	-	-	-	-	-	-	1,000 ac. IS
5513 Dry Creek Basin	-	-	-	-	-	-	-	-	1,000 ac. IS
5516 Piney	6.0 mi.	-	-	-	-	-	-	-	-
5518 Dave Wood	13 Boundary Posts	-	-	-	-	-	-	-	600 ac. C&S
5520 Lower Horsefly: X Lower Horsefly Subunit	-	0.5 mi. Trail	2.0 mi.	2 (1 Horizontal)	1	1	2	8	670 ac. C&S 825 ac. IS 430 ac. CF
5522 Beaver Hill	10 Boundary Posts & Signs	-	7.5 mi.	3	-	-	3	11	150 ac. C&S
5523 Horsefly	3.0 mi.	-	-	-	-	3	-	-	400 ac. C&S
5529 Log Hill	5.0 mi. 1 Cattleguard	-	3.5 mi.	1	-	-	1	4	2,300 ac. C&S
5530 Billy Creek	2.0 mi. 2 Cattleguards	-	-	-	-	5	-	-	-
5540 Dry Gulch	4.0 mi.	-	-	-	-	-	-	-	-
5562 Hillside	1.0 mi.	-	0.5 mi.	-	-	1	-	2	-
5568 Baldy	-	-	-	-	1	1	-	2	-
5570 Cedar	7.0 mi.	-	2.0 mi.	-	1	-	-	2	-
TOTALS	280.5 mi. fences 112 boundary markers 20 cattleguards 1 corral	6 mi. trail 1 stock bridge	139 mi. 4 water taps	18 vert. 1 horiz.	29	86	23	300	20,880 ac. C&S 8,665 ac. IS 1,250 ac. CF

TABLE 8-21
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
EXPECTED ACRES DISTURBED BY PROPOSED RANGE IMPROVEMENTS

Range Improvement	Unit	Total	Acres Disturbed per Unit		Total Acres Disturbed	
			Short-term a/	Long-term b/	Short-term a/	Long-term b/
WATER DEVELOPMENTS						
Vertical Wells	No.	18	0.2	0.2	3.5	3.5
Horizontal Wells	No.	1	0.1	-	0.1	-
Springs	No.	29	0.2	0.2	6.0	6.0
Catchments	No.	1	1.0	0.5	1.0	0.5
Reservoirs	No.	86	1.0	0.1	86.0	8.5
Pipelines	Mi.	139	0.2	-	28.0	-
Water Taps	No.	4	0.03	-	0.1	-
Storage Tanks	No.	23	0.2	0.2	4.5	4.5
Water Troughs	No.	300	0.1	0.001	30.0	0.3
FENCES						
Fences	Mi.	280.5	1.0	0.002	280.5	0.6
Corrals	No.	1	0.5	0.5	0.5	0.5
Boundary Markers	No.	112	0.1	-	11.0	-
OTHER PROJECTS						
Cattleguards	No.	20	0.1	0.004	2.0	0.08
Stock Trails	Mi.	6	1.5	-	9.0	-
Stock Bridges	No.	1	0.1	0.1	0.1	0.1
VEGETATION CONVERSIONS						
Chainings & Seedings	Ac.	20,880	1.0	-	20,880.0	-
Interseedings	Ac.	8,665	1.0	-	8,665.0	-
Contour Furrows	Ac.	1,250	0.05	-	65.0	-
TOTALS					30,072.3	24.58

a/ Short-term means at least eight years from the present, which covers the period of implementation.
b/ Long-term means at least twenty years after full implementation or twenty-eight years from the present (i.e., 2006).

The proposed action stated that under normal storm events, there would be no changes in runoff and sediment yield on allotments with proposed AMPs, but that with the larger storm (50-year/24-hour), there would be a decrease in runoff and sediment yield, as compared with the current situation. The magnitude of the decrease in sediment yield, could not be determined. The decrease in soil loss would have an effect upon the soil, but no data were available to predict the kinds of changes or their magnitude. Under this alternative, 476,165 acres would be affected in comparison with 479,265 acres under the proposed action.

Allotment 5022 (1,250 acres) is expected to have increases in runoff with an unquantifiable increase in sediment. With an increase in soil loss, the soil would be affected, but there are no data available to predict the magnitude and kind of changes which would take place.

Allotments 4506 (1,350 acres) and 5569 (500 acres) are expected to have decreases in runoff and sediment yield. The reduction in soil loss would affect the soil, but no information was found to assist in making predictions.

The erosion condition classes are not expected to change from that of the proposed action (refer to table 3-4 in chapter 3). Under the present condition, 6 percent of the allotment acreage is in the stable erosion condition class; 45 percent is in the slight class; 43 percent is in the moderate class; 5 percent is in the critical class; and 1 percent is in the severe class. By 2006, 27 percent of the acres under this alternative, as under proposed action, would be in the stable erosion condition class; 64 percent would be in the slight class; 8 percent would be in the moderate class; and 1 percent would be in the critical class. The net result would be a 21 percent increase in acres occurring in the stable erosion condition class; a 39 percent increase in acres in the slight class; a 35 percent decrease in acres in the moderate class; a 4 percent decrease in acres in the critical class; and 1 percent in the severe class.

Water Resources

With the exception of allotment 5022 Rabbit Gulch, there is no change predicted in vegetative cover for this alternative (as outlined in the vegetation section), and there are only two allotments (4506 Oak Mesa: Subunit G and 5569 Hairpin) that would have spring-summer grazing which did not have it previously. For all but these three allotments, the hydrologic impacts (infiltration rates, runoff, and sediment yield) as determined by the Gifford, Hawkins, and Williams method (1975) would be the same as those described for the proposed action. Allotment 5022 is expected to have an increase in runoff along with an unquantifiable increase in sediment yield. Allotments 4506G and 5569 are expected to have decreases in runoff and sediment yield similar to other allotments with spring-summer grazing described in the impacts of the proposed action.

Hydrologic impacts of the range improvements in this alternative would be similar to those described in the proposed action. The additional fencing would have insignificant hydrologic impacts. Table 8-22 shows the short-term impacts on sediment yield from the proposed range improvements and land treatments under this alternative.

Vegetation

Refer to table 8-23 for short-term impacts on vegetation by allotment under this alternative. For a discussion of individual short-term impacts and their cumulative long-term impacts, refer to chapter 3 vegetation section.

Long-term impacts on vegetation in all allotments except 5022 Rabbit Gulch would be the same as those listed in tables 3-8 and 3-9. Refer to table 8-24 for predicted long-term vegetative production, density, and key species composition on 5022 Rabbit Gulch allotment, which would be changed from deferred grazing under custodial management to essentially season-long grazing under custodial management. Range condition on this allotment would be expected to remain the same as listed in table 2-10. Predicted long-term production for the ES area under this alternative would be 63,945 AUMs available for wildlife and livestock use. Range condition for the ES area would be 222,555 acres in good, 286,335 acres in fair, and 16,885 acres in poor condition. These condition figures represent an increase of 197 percent from acres presently in good range condition, an increase of 33 percent from acres presently in fair range condition, and a decrease of 93 percent from acres presently in poor range condition.

Construction of range improvements for this alternative would temporarily remove approximately 30,072 acres from production and permanently remove about 25 acres. Road maintenance for water hauling is expected to have no additional

TABLE 8-22
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
SHORT-TERM IMPACTS OF PROPOSED RANGE IMPROVEMENTS ON SEDIMENT YIELDS

Improvement	Acres Disturbed	Short-Term Increase/Decrease in Sediment Yields (tons)	Comments		
			Infiltration Rates	Runoff	Assumptions
Fences	280.5	+5,610			Calculations for all improvements except vegetative conversions assume: (1) uppermost limit of very high yield sediment class from Sediment Yield Map (Colo. Land Use Commission 1974), (2) sediment yield from disturbed areas of at least 3 acre feet per mile per year or 8 tons per acre per year, (3) equal rate of ground cover increases for 4 years, (4) 4 years to establish sufficient ground cover to stablize the area. Calculations use Universal Soil Loss Equation.
Boundary Markers	11.0	+220			
Cattleguards	2.0	-			
Corrals	0.5	-			
Stockbridges	0.1	-			
Stock Trails	9.0	+180			
Pipelines	28.0	+560			
Water Taps	0.1	-			
Wells	3.5	+70			
Horizontal Well	0.1	-			
Storage Tanks	4.5	+90			
Catchments	1.0	+20			
Reservoirs	86.0	+435			
Springs	6.0	+120			
Troughs	30.0	+610			
Vegetative Conversion:					
Chaining & Seeding	20,880.0	-	No change.	No increase from high-intensity storms.	
Interseeding	8,665.0	-	Little change.	Little change.	Negligible surface, soil disturbance.
Contour Furrows	65.0	-5,025	No effect on infiltration between furrows.	Reduce velocity of surface runoff. Store sediment yielded from between furrows.	Calculations use Universal Soil Loss Equation.
TOTALS	30,072.3	+2,890			

TABLE 8-23
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
PREDICTED SHORT-TERM IMPACTS ON VEGETATION

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4006 Dry Mesa: A Escalante Subunit 5003 Selig Canal: S Selig Canal Subunit	5511 Shavano Mesa 5512 Franklin Mesa	Rest Rotation--Two Treatments (13,555 acres):	
		Utilize forage in fall or winter.	Litter accumulation reduced. Seed trampling increased.
		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.
4516 North Fork: K South-of-Hotchkiss Subunit L Hubbard Subunit		Rest Rotation--Two Treatments (3,100 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Allows some seedling establishment.
4016 Wells Gulch 4017 Alkali Flats 4022 Petrie Mesa E Peach Valley Subunit 4517 Coal Gulch 5008 Brush Point 5010 Dead Horse	5015 Grizzly Gulch 5028 Doug Creek 5030 Bostwick Park U Black Canyon-Jones Draw Subunit	Rest Rotation--Three Treatments (86,685 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Utilize forage in fall or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
		Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation increased. Seedling establishment increased.

a/ Short-term impacts on vegetation would last one to three years.

TABLE 8-23
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4001 Dominguez 4006 Dry Mesa: B Dry Mesa Subunit 4007 Sawmill Mesa 4008 25 Mesa 4010 Monitor Mesa 4012 Canal 4013 Ben Lowe 4024 Dirty George 4025 Ward Creek-Doughspoon 4503 Stingley Gulch 4504 Leroux Creek 4506 Oak Mesa 4507 Jay Creek 4513 Stevens Gulch 4516 North Fork: M Deer Basin Subunit 4525 Anthracite Creek 4527 Jumbo Mountain 4528 Oak Ridge 4529 Reynolds Creek 4530 McDonald Mesa	4537 Young's Peak: Q Young's Peak Subunit 4540 North Saddle Peak 4549 Dry Creek 5011 Gould Reservoir 5013 Iron Canyon 5014 Poison Spring 5017 Green Mountain 5020 Black Ridge 5030 Bostwick Park: V Adobe South Subunit 5502 Sandy Wash 5505 Transfer 5507 Pipeline 5513 Dry Creek Basin 5516 Piney 5521 Highway 90 5522 Beaver Hill 5529 Log Hill 5530 Billy Creek 5569 Hairpin	Rest Rotation--Three Treatments (331,315 acres): Utilize forage spring and summer. Utilize forage after seed ripe of key species (determined for each allotment). Rest from grazing yearlong.	Vigor, reproduction, and litter accumulation reduced. Litter accumulation reduced. Seed trampling increased. Vigor, reproduction and litter accumulation increased.
4021 Point Creek 5503 Green 5504 Roatcap 5508 Government Springs	5520 Lower Horsefly: X Lower Horsefly Subunit 5523 Horsefly 5540 Dry Gulch	Rest Rotation--Four Treatments (17,955 acres): Utilize forage in spring. Utilize forage in fall. Rest from grazing yearlong. Utilize forage in fall or winter.	Vigor, reproduction, and litter accumulation reduced. Litter accumulation reduced. Vigor, reproduction, and seed trampling increased. Vigor, reproduction, and litter accumulation increased. Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.

TABLE 8-23
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name		Grazing Systems or Season of Use	Short-Terms Impacts a/
4502 Surface to Leroux 4532 McDonald Ranch: N Lambing Shed Subunit	5016 Black Canyon 5029 Spring Gulch 5570 Cedar	Deferred Rotation (11,865 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Defer grazing one growing season, and utilize forage in fall.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
5566 Cow Creek		Deferred Rotation (520 acres):	
		Utilize forage in spring.	Vigor, reproduction, and litter accumulation reduced.
		Defer grazing one growing season, and utilize forage in fall.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
		Utilize forage in summer.	Vigor, reproduction, and litter accumulation reduced.
4002 Lower Escalante 4022 Petrie Mesa: F Petrie Mesa Subunit 4532 McDonald Ranch: O South-of-Town Subunit P Harrington Subunit 5049 Smith Fork	5518 Dave Wood 5520 Lower Horsefly: Y Dry Cedar Subunit 5532 Burro Ridge 5534 Shin Park 5562 Hillside 5568 Baldy	Deferred (20,470 acres):	
		Defer grazing during growing season, and utilize forage in fall or winter each year.	Defer: Vigor, reproduction, and litter accumulation increased. Seedling establishment increased. Graze: Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4011 Lower Roubideau		Trailing (480 acres):	
		Utilize forage spring and fall each year.	Vigor, reproduction, and litter accumulation reduced. Seed trample increased and seedling establishment reduced.

TABLE 8-23
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
PREDICTED SHORT-TERM IMPACTS ON VEGETATION (cont.)

Allotment No. & Name						Grazing Systems or Season of Use	Short-Terms Impacts a/
4026 Escalante Canyon	5533 Onion Lakes					Custodial (5,565 acres):	
4501 Milk Creek	5536 South Canal						
4514 Upper Terror Creek	5538 Rock Ditch					Utilize forage in fall and/or winter.	Litter accumulation reduced. Vigor, reproduction, and seed trampling increased.
4535 Home Place	5542 Bosgal						
5026 Star Nelson Airport	5543 Waugh						
5036 Big Gulch	5544 Kelly						
5045 Black Bullet	5545 Henshaw						
5525 Dry Creek	5547 Slagle Pass						
	5564 Gravel Pit						
	5567 Busted Boiler						
4005 Fall Cabin	4531 Popp Ranch					Custodial (23,895 acres):	
4006 Dry Mesa:	4536 West Young's Peak						
C Smith Ranch Subunit	4537 Young's Peak:					Utilize forage season-long, spring and fall, or most of the growing season.	Vigor, reproduction, and litter accumulation reduced. (Some seed trample where fall use occurs.) Seedling establishment reduced.
D Escalante Creek Subunit	R Crawford Subunit						
4014 Joker	4538 Missouri Flats						
4015 White Ranch	4539 Cottonwood Creek						
4505 Juniper Knob	4541 Sunshine Mesa						
4509 Upper Jay Creek	4543 South Saddle Peak						
4511 Overland	4548 Creek Bottom						
4512 East Roatcap	5002 Dedication Site						
4515 Freeman Gulch	5003 Selig Canal:						
4518 Pilot Creek	T Rawhide-Coffeepot Subunit						
4519 Muddy Creek	5012 Cedar Point						
4520 Spring Creek	5022 Rabbit Gulch						
4521 Stock Driveway							
4522 Downing							
4523 Williams Creek							
4524 Deep Creek							
4526 Crystal Creek							
		5025 Fruitland Mesa	5043 Collins	5524 Duckett Draw			
		5027 Adobe	5044 Big Pasture	5535 Cedar Creek			
		5030 Bostwick Park:	5046 Big Gulch	5546 Waterdog Basin			
		W Bostwick Park Subunit	5047 Mesa Creek	5548 Washboard Rock			
		5033 Pinyon Springs	5048 Morrow Point	5549 High Park			
		5038 Red Canyon	5050 Allen Reservoir	5551 Dexter Creek			
		5039 Onion Valley	5509 Coal Creek	5561 East Fork			
		5040 Pine Ridge	5510 Bald Hills	5563 Moonshine Park			
		5041 East Gould Reservoir	5514 East Fork Dry Creek	5565 Tommy Creek			
			5515 Olathe Reservoir	5574 Tappan Creek			
			5517 Spring Creek Canyon				
5037 Black Mesa	5556 Burro Creek					Elimination of grazing (3,020 acres):	
5552 Dallas	5557 Alkali						
5553 Fisher Creek	5559 South Fork					No livestock grazing.	Vigor, reproduction, and litter accumulation increased. Seedling establishment allowed.
5555 Taylor Draw	5560 Cookie Tree						
	5572 McKenzie Creek						

TABLE 8-24
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING: LONG-TERM IMPACTS ON 5022 RABBIT GULCH

Allotment Name, No. & Veg. Type	Present Prod. (AUMs)	Potential Prod. (AUMs)	Veg. Dens. (%)	Key Species Composition a/ (%)			Future Prod. (AUMs)	Future Veg. Dens. (%)	Future Key Species Composition a/ (%)		
				Orhy	Arno	Atca			Orhy	Arno	Atca
5022 Rabbit Gulch	70	300					55				
Pinyon-Juniper			45	4	-	T		36	2	-	T
Sagebrush			38	T	13	-		30	T	13	-

a/ Orhy = Oryzopsis hymenoides (Indian ricegrass); Arno = Artemisia alnifolia (common serviceberry); Atca = Atriplex canescens (fourwing saltbush).

impacts on vegetation since the work would be done on existing roads. All other short- and long-term impacts on vegetation from range improvements would be the same as described in chapter 3.

ENDANGERED PLANTS

The impacts to endangered plants under Alternative D would be the same as for the proposed action. They could be mitigated as outlined in chapter 4.

Wildlife: Terrestrial

Within the first ten years after implementation, mule deer populations could be expected to increase 20 to 35 percent over the present population, elk populations by 15 to 20 percent, and antelope populations by 40 to 50 percent. These predictions take into account the present number, apparent rate of increase, range condition, and those animals that could be supported as a result of the reduction in livestock grazing in crucial areas. Deer and elk use would increase as the livestock stocking rate is reduced (U.S. Department of Agriculture, no date). Vegetation is not expected to increase above the proposed action (see vegetation section).

Over the long term (by 2006), assuming that DOW does not expand hunting seasons or bag limits, the populations could level off or increase above the carrying capacity of the range, and then the population could decline. (See Errington 1956 and Dasmann 1964 for a more complete discussion of population growth.) In the ES area, the additional animals contributed by this alternative could cause the expansion of the populations beyond the limits of the habitat. The northern end of the Uncompahgre Plateau would be one exception to this, due to the small population there at present. This expansion could then cause habitat destruction and animal die-offs.

Close monitoring of vegetation, livestock, and wildlife responses to this type of management would have to be done to ensure that the habitat is not overutilized and that stocking rates are adequate. Initial livestock stocking rates would be adjusted if studies indicate that such adjustments should be made. These studies would be the current browse transects, pellet group counts, and utilization transects such as those in the proposed action. In addition, studies of reproduction rates of wildlife would be initiated since this is much more sensitive to habitat changes and population density than browse transects or pellet group counts (Gross 1969). In this way, monitoring of vegetation and wildlife response could be measured and adjustments made as deemed necessary. The adjustments would be made in livestock stocking rates because of the ease in control as compared with a wild population.

If the populations of wildlife are as close to the maximum production level as thought and the population is increased and then declines, the net population change for this alternative over the long term could be as much as 1 to 2 percent over or as low as −2 percent below the present situation. With proper control exerted on the wildlife species, the populations could be held within the carrying capacity of the habitat. Population increases would then be similar to those under the proposed action, since the proposed action included the assumption that the proposed percentage increase in wildlife populations would contain the population within the carrying capacity.

Impacts, mitigation, and unmitigated impacts of range improvements would be the same as the proposed action.

Wildlife: Aquatic and Riparian

With the proposed 24.5 miles of fencing, riparian and aquatic communities on these stream sections would attain improved conditions. Riparian species which would reestablish are willow (*Salix*), cottonwood (*Populus*), wildrose (*Rosa*), and elderberry (*Sambucus*). This proposal would result in an increase of 20.1 miles of riparian habitat in excellent condition for a total of 32.5 miles, a decrease of 2.5 miles of riparian habitat in good condition to a total of 42.9 miles, an increase of 13.4 miles in fair condition to give 74.2 miles total, and corresponding decreases of 28.9 and 2.1 miles of riparian habitats in poor and nonexistent condition to give totals of 1.8 and 11.4 miles. Aquatic species characteristic of the area would increase in Monitor Creek, Roubideau Creek, and West Fork of Dry Creek. Other streams would respond exactly as described in chapter 3 for the proposed action.

Agriculture: Livestock Grazing

Under this alternative, a total short-term reduction of 8,634 AUMs from the present active licensed use for the ES area would be imposed. The long-term (2006) loss of active licensed use would be 7,123 AUMs. For a listing of allotment specific amounts of use, resultant reductions, and

seasons of use, see table 8-25. These effects would cause especially severe impacts on operators of these allotments for at least the first few years and would probably have impacts on other non-BLM portions of the livestock industry in the ES area. These impacts are as follows:

First, two allotments (4016 Wells Gulch and 4017 Alkali Flats) would receive changes in class of livestock from sheep to cattle which could, in effect, cause replacement of present operators of these allotments with two new ones.

Second, as shown in the table, 37 allotments would receive changes in season of use along with the reduction in AUM use. These changes in season of use are from fall, winter, or early spring to later spring and summer. Thirty-one of these allotments' operators use national forest lands (NFL) during the summer, which could mean another change in operators to those without Forest Service permits or changes in individual operations using other livestock than those which graze NFL each year. Those operators who continue to use BLM permits could have decreased hay crop production by as much as 1.5 tonsper acre.

Third, with the alternative, ten allotments would have a shorter season of use than at present (reductions range from two weeks to three months). Impacts of this sort on livestock operators are discussed in chapter 3.

Fourth, 32 allotments included in this alternative do not have adequate livestock water for the alternative season of grazing. Water would have to be provided for livestock by the operators from domestic water or other supplies, rather than from on-site sources as presently available. Hauling livestock water for these allotments would require additional labor and equipment expense to provide approximately 2.5 million gallons annually for the ES area. Since ES area livestock operations are family, low-margin operations, there could be a devastating impact on these operations from this effect.

Over the long term (by 2006), the alternative livestock use would remain the same as proposed on the 56 allotments receiving reductions.

Recreation

With this alternative, wildlife populations would be expected to increase initially, then decrease proportionately as they outstrip their food source (see Wildlife). Similarly, hunter days and hunter success ratios can be expected to increase initially. However, success ratios would decrease at a greater rate than hunter days when wildlife populations begin to decline after their initial surge. Specific numbers and percent changes have not been calculated here in anticipation of DOW concurrent management control measures.

Socio-Economic Conditions

POPULATION

ES area population trends are not expected to be altered by this alternative.

INCOME

Active licensed use would be reduced immediately to 26,735 AUMs, which would be a reduction of 8,634 AUMs from the 1975 level. This would reduce direct range livestock-related income (1970 dollars) by $25,038.60 (8,634 X $2.90 = $25,038.60) and total direct and indirect range livestock-related income by $37,232.40 ($25,038.60 X 1.487 = $37,232.40). This short-term reduction in total direct and indirect livestock-related income would be 0.571 percent of the 1974 level and 0.024 percent of 1974 total personal income for the ES area.

Over the long term, active licensed use would increase from the immediately reduced level until by 2006 it would be 28,246 AUMs, which would be a 7,123 AUM reduction from the 1975 level. Thus, the long-term reduction in direct range livestock-related income would be $20,656.70 (7,123 X $2.90 = $20,656.70) and total direct and indirect range livestock-related income would be reduced by $30,716.51 ($20,656.70 X 1.487 = $30,716.51). This reduction would amount to 0.471 percent of 1974 total direct and indirect range livestock-related income and 0.020 percent of 1974 total personal income for the ES area.

Livestock operators on 32 allotments would also have additional costs in the form of water hauling operations which would affect their net income situation. About 2.5 million gallons of water would have to be hauled to livestock annually at an expense of about $10 per 1,000 gallons which would amount to $25,000 annually.

Contract construction-related income would be increased over the levels indicated in chapter 3 due to the necessity of installing an additional 100.5 miles of fence and eight cattleguards as well as maintaining 400 miles of existing road (maintained by BLM) to facilitate water hauling operations mentioned above.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
4001 Dominguez*	5,600	1,833	7,250	1,448	-385	1,833	10/16 - 05/30	05/01 - 08/31
4002 Lower Escalante	335	300	375	300	0	300	01/09 - 01/30	01/09 - 01/30
4005 Fall Cabin	40	18	40	13	-5	18	05/11 - 05/31 10/16 - 10/31	05/01 - 08/31
4006 Dry Mesa*	1,185	883	1,585	518	-365	518	12/01 - 12/31 05/08 - 05/31 11/01 - 12/31	04/25 - 08/31
4007 Sawmill Mesa*	790	536	1,210	239	-297	239	05/01 - 05/31 10/16 - 12/15	05/01 - 08/31
4008 25 Mesa	810	644	985	541	-103	541	05/06 - 05/20	05/03 - 08/31
4010 Monitor Mesa	1,435	1,174	1,680	822	-352	822	05/16 - 05/31	05/16 - 08/31
4011 Lower Roubideau Canyon	45	89	65	27 (Trailing)	-62	35	10/06 - 10/21	05/15 - 05/20 10/15 - 10/20
4012 Canal	1,000	831	1,220	667	-164	667	05/15 - 07/31 10/16 - 11/15	05/15 - 08/31
4013 Ben Lowe	570	446	755	356	-90	356	05/21 - 05/31 10/16 - 11/30	05/21 - 08/31
4014 Joker	115	87	150	61	-26	61	05/21 - 10/31	05/21 - 10/31
4015 White Ranch	25	10	35	10	0	10	04/01 - 05/31 10/16 - 02/28	04/01 - 05/31 10/16 - 02/28
4016 Wells Gulch	2,680	2,380	3,145	1,656	-724	1,656	11/15 - 04/30	11/15 - 04/30
4017 Alkali Flats*	3,560	2,651	4,130	1,444 (4 yr. avg.)	-1,207	1,444	03/01 - 02/28 10/15 - 10/30	12/11 - 05/07
4021 Point Creek	115	0	135	77 (4 yr. avg.)	+77	101	03/15 - 05/20	03/15 - 05/20 10/15 - 12/20
4022 Petrie Mesa	1,430	1,258	1,430	1,258	0	1,163	12/01 - 04/30	12/01 - 04/30
4024 Dirty George	300	236	340	209 (2 yr. avg.)	-27	209	05/16 - 06/15 10/16 - 11/15	05/16 - 06/15 10/16 - 11/15
4025 Ward Creek-Doughspoon	700	441	1,020	380	-61	380	05/01 - 06/15 10/15 - 11/15	05/11 - 08/31
4026 Escalante Canyon	40	20	40	20	0	20	01/01 - 02/07	01/01 - 02/07
4501 Milk Creek	15	16	15	16	0	16	05/15 - 05/31 05/19 - 06/15	08/15 - 08/31 05/26 - 06/15
4502 Surface to Leroux	495	443	655	443	0	418	10/16 - 10/21	10/16 - 10/21
4503 Stingley Gulch	125	98	150	69	-29	69	05/10 - 06/09	05/10 - 08/31
4504 Leroux Creek	195	249	260	175	-74	175	05/15 - 08/31	05/15 - 08/31

Note: Present production is based on Bureau of Land Management, Uncompahgre Basin Resource Area unit resource analyses and allotment management plans. For a discussion of methodology and data base for current production levels, refer to appendix 4. Predicted production is estimated for twenty years after full implementation of the alternative (i.e., 2006).

a/ Production numbers include forage available for wildlife and livestock use. One AUM equals 1,800 pounds of forage.

b/ Proposed use is the number of AUMs and the season of use to be licensed under the alternative.

c/ Assumes that the active grazing qualifications of the permittees are filled by predicted increases in productivity.

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
4505 Juniper Knob	10	None	10	10	+10	4	05/01 - 06/15 01/11 - 02/10	05/01 - 06/30
4506 Oak Mesa	95	64	140	31	-33	31	01/11 - 02/10 05/01 - 06/15 06/16 - 09/15	05/01 - 08/31
4507 Jay Creek	1,030	879	1,350	723	-156	723	05/16 - 10/30	05/16 - 08/31
4509 Upper Jay Creek	75	94	95	47	-47	47	05/20 - 09/30	05/20 - 08/31
4511 Overland	20	29	30	10	-19	10	06/01 - 06/15 10/15 - 10/30	06/16 - 08/31
4512 East Roatcap	10	68	10	7	-61	7	06/19 - 10/12	06/19 - 08/31
4513 Stevens Gulch	865	694	1,070	468	-226	468	05/01 - 06/30	05/16 - 08/31
4514 Upper Terror Creek	5	17	5	3	-14	16	09/15 - 10/15	09/15 - 10/15
4515 Freeman Gulch	70	53	70	37	-16	37	06/01 - 10/31	06/01 - 08/31
4516 North Fork	2,630	1,079	3,380	1,041 (3 yr. avg.)	-38	1,041	11/05 - 07/19	05/15 - 08/31
4517 Coal Gulch*	770	484	1,000	440 (3 yr. avg.)	-44	568	05/01 - 08/05 10/23 - 11/13	05/01 - 07/24 10/01 - 11/13
4518 Pilot Creek	40	38	40	33	-5	33	06/16 - 07/30 10/11 - 11/12	06/16 - 07/30 10/11 - 11/12
4519 Muddy Creek	25	16	25	16	0	16	05/16 - 06/25	05/16 - 06/25
4520 Spring Creek	30	26	30	18	-8	18	06/11 - 06/15 10/06 - 10/20	06/12 - 08/31
4521 Stock Driveway	10	6	10	6	0	5	06/16 - 07/30 10/20 - 11/12	06/01 - 06/06 11/01 - 11/06
4522 Downing	30	22	30	24	+2	27	05/26 - 06/17 09/16 - 09/30	05/26 - 06/17 09/16 - 09/30
4523 Williams Creek	10	8	10	8	0	8	05/16 - 07/15	05/16 - 07/15
4524 Deep Creek	10	3	10	3	0	4	06/01 - 10/15	06/01 - 10/15
4525 Anthracite Creek	170	118	210	82	-36	82	06/04 - 09/15	06/04 - 08/31
4526 Crystal Creek	60	51	60	51	0	50	05/16 - 09/30	05/16 - 09/30
4527 Jumbo Mountain	700	413	860	402	-11	402	05/11 - 06/15 05/21 - 06/15	05/11 - 08/31
4528 Oak Ridge	335	210	400	167	-43	167	05/21 - 06/15 06/11 - 06/20	05/21 -08/31
4529 Reynolds Creek	190	158	210	111	-47	111	06/11 - 06/20 10/06 - 10/07	06/15 - 08/31

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
4530 McDonald Mesa*	205	100	310	85	-15	85	06/01 - 06/20	06/01 - 08/31
4531 Popp Ranch	15	8	15	4	-4	4	05/15 - 06/14 11/15 - 12/25	05/15 - 06/14
4532 McDonald Ranch*	725	536	815	546	+10	546	03/01 - 05/31 10/01 - 02/28	04/06 - 05/15 10/06 - 10/30 12/01 - 02/28
4535 Home Place	15	15	15	15	0	15	03/21 - 05/08 10/07 - 10/15	10/07 - 10/15
4536 West Young's Peak	10	6	15	6	0	6	05/01 - 07/31	05/01 - 07/31
4537 Young's Peak	240	171	280	101 (3 yr. avg.)	-70	101	05/15 - 07/14 09/01 - 09/30	05/15 - 08/31
4538 Missouri Flats	5	4	5	4	0	4	06/12 - 09/15	06/12 - 09/15
4539 Cottonwood Creek	10	10	10	8	-2	10	05/20 - 06/03 09/15 - 09/29	05/20 - 06/03 09/15 - 09/29
4540 North Saddle Peak	40	31	45	23	-8	23	06/01 - 08/31	06/01 - 08/31
4541 Sunshine Mesa	5	5	5	5	0	5	05/15 - 09/14	05/16 - 06/15
4543 South Saddle Peak	20	13	20	13	0	13	06/16 - 06/20 10/10 - 10/15	06/16 - 06/20 10/10 - 10/15
4548 Creek Bottom	10	5	10	5	0	5	06/01 - 10/15	06/01 - 10/15
4549 Dry Creek*	265	135	410	132 (3 yr. avg.)	-3	132	05/12 - 06/15 10/16 - 10/20	05/16 - 08/31
5002 Dedication Site	100	213	100	44	-169	44	03/01 - 04/30	03/01 - 04/06
5003 Selig Canal*	725	330	815	400 (3 yr. avg.)	+70	543	05/16 - 05/25 10/01 - 10/10 12/15 - 02/16	05/16 - 08/31
5008 Brush Point	1,755	1,123	2,315	1,150	+27	1,153	11/14 - 05/06	11/14 - 03/02
5010 Dead Horse	200	171	250	113	-58	170	05/11 - 10/25	05/20 - 06/19 09/16 - 10/15
5011 Gould Reservoir	390	305	470	142 (3 yr. avg.)	-163	142	05/05 - 06/30 09/05 - 10/31	05/05 - 08/31
5012 Cedar Point	80	55	80	38	-17	38	05/10 - 07/09	05/30 - 08/31
5013 Iron Canyon	135	95	175	44	-51	44	05/06 - 06/30	05/15 - 08/31
5014 Poison Spring	145	99	210	46	-53	46	05/01 - 06/30	05/15 - 08/31
5015 Grizzly Gulch	260	349	300	230 (3 yr. avg.)	-119	345	05/11 - 08/12	05/11 - 05/27 08/16 - 09/02

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
5016 Black Canyon	45	82	50	45	-37	79	05/11 - 06/30	05/11 - 06/30
								10/11 - 10/30
5017 Green Mountain*	2,825	1,647	3,725	1,162	-485	1,162	05/03 - 11/25	05/15 - 08/31
5020 Black Ridge	605	400	765	280	-120	280	11/16 - 01/15	05/15 - 08/31
5022 Rabbit Gulch	70	35	55	25	-10	25	11/10 - 12/14	05/01 - 08/31
5025 Fruitland Mesa	5	2	5	2	0	2	05/01 - 11/30	05/01 - 11/30
5026 Star Nelson Airport	5	11	5	5	-6	11	01/02 - 02/28	01/02 - 02/28
5027 Adobe	30	24	35	24	0	24	05/01 - 05/30	05/15 - 06/14
5028 Doug Creek	70	60	80	40	-20	60	05/01 - 06/15	05/16 - 06/15
				(3 yr. avg.)				09/01 - 09/30
5029 Spring Gulch	150	110	180	110	0	111	06/01 - 09/20	06/01 - 09/20
5030 Bostwick Park	380	188	450	111	-77	140	04/16 - 10/31	05/01 - 08/31
5033 Pinyon Springs	160	132	160	131	-1	131	05/16 - 10/31	06/02 - 10/16
5036 Big Gulch	5	5	5	5	0	6	04/01 - 04/30	11/01 - 11/30
5037 Black Mesa**	0	6	0	0	-6	0	07/01 - 07/20	None
5038 Red Canyon	5	3	5	2	-1	2	05/10 - 10/30	05/10 - 08/31
5039 Onion Valley	20	17	20	12	-5	12	07/01 - 09/05	07/01 - 08/31
5040 Pine Ridge	15	14	15	14	0	14	06/01 - 11/15	06/01 - 11/15
5041 East Gould Reservoir	40	20	60	20	0	20	06/06 - 06/15	06/06 - 06/15
5043 Collins	15	10	15	10	0	10	05/05 - 06/04	05/05 - 06/04
5044 Big Pasture	20	15	20	15	0	15	05/16 - 06/15	05/16 - 06/15
5045 Black Bullet	5	3	5	3	0	3	11/01 - 12/18	11/01 - 11/30
5046 Big Gulch*	35	0	40	35	+35	39	04/16 - 05/23	03/02 - 04/17
5047 Mesa Creek*	75	23	75	55	+32	55	06/01 - 10/15	05/01 - 10/15
5048 Morrow Point	40	8	40	8	0	8	05/20 - 06/10	05/20 - 06/10
5049 Smith Fork	30	19	45	19	0	19	05/01 - 06/10	11/01 - 11/06
							11/06 - 11/15	
5050 Allen Reservoir	30	23	40	24	+1	39	05/16 - 06/04	05/16 - 06/04
							10/15 - 10/22	10/16 - 10/20
5502 Sandy Wash	940	707	1,140	495	-212	495	12/01 - 03/16	05/15 - 08/31
5503 Green	50	39	65	24	-15	39	05/25 - 06/19	05/30 - 06/19
				(4 yr. avg.)				10/20 - 11/12
5504 Roatcap	350	264	445	195	-69	264	02/17 - 03/21	05/07 - 06/15
				(4 yr. avg.)				10/16 - 11/24
5505 Transfer	300	214	355	150	-64	150	10/16 - 11/16	05/15 - 08/31

* Annual license includes nonuse applied for in addition to use shown.
** This allotment has no grazeable acreage; therefore, no production was calculated for the allotment.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
5507 Pipeline	2,270	1,715	2,890	1,092	-623	1,092	11/11 - 11/26 12/07 - 06/09	05/15 - 08/31
5508 Government Springs	180	125	225	83 (3 yr. avg.)	-42	125	05/16 - 06/15 10/16 - 11/15	05/16 - 06/15 10/16 - 11/15
5509 Coal Creek	50	44	50	44	0	44	03/01 - 05/26 11/10 - 01/25	05/16 - 05/30 11/08 - 11/15
5510 Bald Hills	25	21	25	21	0	21	05/29 - 06/30 10/11 - 11/09	05/29 - 06/30 10/11 - 11/09
5511 Shavano Mesa	200	261	260	200	-61	260	12/20 - 02/06	12/20 - 02/06
5512 Franklin Mesa*	355	363	440	350	-13	447	12/16 - 02/26	12/16 - 02/26
5513 Dry Creek Basin*	410	440	535	206	-234	206	12/11 - 02/16	05/15 - 08/31
5514 East Fork Dry Creek	15	11	15	11	0	11	06/01 - 10/27	06/01 - 10/27
5515 Olathe Reservoir	15	18	15	17	-1	17	05/16 - 10/15	05/16 - 10/15
5516 Piney	800	557	1,110	390	-167	390	06/01 - 10/31	06/01 - 08/31
5517 Spring Creek Canyon	35	52	35	25	-27	25	05/31 - 10/15	05/31 - 08/31
5518 Dave Wood	215	176	340	144	-32	178	04/15 - 05/06	09/15 - 10/04
5520 Lower Horsefly	965	665	1,105	664	-1	667	12/01 - 02/15 03/01 - 05/15	05/01 - 05/12 10/20 - 11/17 01/01 - 02/15
5521 Highway 90	445	265	685	230	-35	278	04/02 - 06/07	05/01 - 08/31
5522 Beaver Hill	1,570	1,022	1,875	654	-368	654	05/16 - 06/30 10/01 - 10/20 12/08 - 12/28	05/16 - 08/31
5523 Horsefly	55	38	130	15 (4 yr. avg.)	-23	37	05/11 - 07/02 09/12 - 10/14	06/01 - 07/02 09/15 - 11/14
5524 Duckett Draw	15	20	20	6	-14	5	03/18 - 05/30 11/01 - 12/31	04/01 - 05/31 11/01 - 12/31
5525 Dry Creek	15	15	15	9	-6	17	03/01 - 05/20 12/01 - 02/28	09/20 - 10/19
5529 Log Hill	310	189	420	107	-82	107	05/16 - 06/13 10/16 - 10/31	05/16 - 08/31
5530 Billy Creek	265	150	550	95	-55	95	05/01 - 07/01 08/20 - 09/15	05/10 - 08/31
5532 Burro Ridge	20	15	25	15	0	15	05/01 - 06/15	08/16 - 09/30
5533 Onion Lakes	35	15	35	15	0	15	10/16 - 11/30	10/16 - 11/30
5534 Shin Park	300	251	300	187	-64	256	11/30 - 01/16	12/01 - 01/15
5535 Cedar Creek	10	6	10	6	0	6	06/01 - 06/30	06/01 - 06/30
5536 South Canal	120	60	120	57	-3	57	01/01 - 01/18	01/01 - 01/17
5538 Rock Ditch	5	9	5	5	-4	9	11/01 - 11/30	11/01 - 11/30
5540 Dry Gulch	930	808	1,035	795	-13	797	03/01 - 06/24 12/28 - 02/28	05/01 - 06/04 11/01 - 11/12 12/01 - 01/31

* Annual license includes nonuse applied for in addition to use shown.

TABLE 8-25
ALTERNATIVE D: REDUCED LIVESTOCK GRAZING:
A COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 2006) USE (Cont.)

Allotment Number & Name	Present Production (AUMs) a/	Present Active Licensed Use (AUMs)	Predicted Production (2006) (AUMs) a/	Proposed Alternative Use (AUMs) b/	Difference from Present Active Licensed Use (AUMs)	Predicted Alternative Use (2006) (AUMs) c/	Present Season of Use	Proposed Alternative Season of Use b/
5542 Bosgal	5	9	10	5	-4	9	03/01 - 04/30 12/01 - 02/28	09/01 - 02/28
5543 Waugh	10	30	10	10	-20	40	12/16 - 02/28	12/16 - 02/28
5544 Kelly	5	2	5	2	0	4	11/01 - 12/15	11/01 - 12/15
5545 Henshaw	15	12	20	12	0	12	01/10 - 01/20	10/15 - 11/15
5546 Waterdog Basin	45	35	45	35	0	34	03/20 - 10/30	03/20 - 10/30
5547 Slagel Pass	40	30	40	30	0	30	07/28 - 09/27	07/28 - 09/27
5548 Washboard Rock	55	34	55	34	0	34	05/16 - 09/15	05/16 - 09/15
5549 High Park	110	61	110	61	0	61	07/01 - 09/30	07/01 - 09/30
5551 Dexter Creek	5	3	5	3	0	3	06/01 - 06/21	06/01 - 06/21
5552 Dallas	15	24	20	0	-24	0	09/01 - 10/01	None
5553 Fisher Creek	40	34	50	0	-34	0	05/01 - 05/31	None
5555 Taylor Draw	25	55	30	0	-55	0	05/01 - 05/30	None
5556 Burro Creek	10	15	15	0	-15	0	03/01 - 05/15 10/15 - 02/28	None
5557 Alkali	40	20	50	0	-20	0	12/15 - 02/28	None
5559 South Fork	15	12	20	0	-12	0	05/01 - 05/31	None
5560 Cookie Tree	50	57	65	0	-7	0	07/20 - 10/04	None
5561 East Fork	5	14	5	5	-9	14	06/15 - 07/31 10/01 - 10/31	06/15 - 07/31 10/01 - 10/31
5562 Hillside	10	40	15	10	-30	20	06/01 - 09/30	08/15 - 09/30
5563 Moonshine Park	10	7	10	7	0	7	07/01 - 09/30	07/01 - 09/30
5564 Gravel Pit	5	4	5	4	0	4	10/01 - 12/15	10/01 - 11/08
5565 Tommy Creek	20	18	20	3	-15	18	05/05 - 06/13 12/15 - 02/28	04/16 - 06/15
5566 Cow Creek	105	70	120	80	+10	80	06/20 - 07/10	06/20 - 07/30 09/01 - 09/20
5567 Busted Boiler	5	2	5	2	0	2	08/01 - 09/30	08/01 - 09/30
5568 Baldy	135	88	165	67	-21	88	06/01 - 09/30	08/16 - 09/30
5569 Hairpin	30	18	40	13 (3 yr. avg.)	-5	13	05/16 - 05/30 10/01 - 10/10	05/16 - 08/31
5570 Cedar	375	315	470	236	-79	315	05/01 - 06/30	05/15 - 06/14 10/17 - 11/16
5572 McKenzie Creek	10	5	15	0	-5	0	05/01 - 10/31	None
5574 Tappan Creek	20	11	20	11	0	12	04/11 - 05/10	04/11 - 05/10
TOTALS	51,315	35,369	63,945	26,735	-8,634	28,246		

The fence would cost $241,200 (100.5 miles at $2,400 per mile) and the cattleguards would cost $11,200 (eight cattleguards at $1,400 each). Annual operations and maintenance cost would be $5,155 for the fence and $224 for the cattleguards. Maintenance cost for the 400 miles of road (at $200 per mile) would be $80,000 annually.

Thus, new construction would add an additional $53,792 in contract construction income to area residents ($268,960 x 0.20 = $53,792) during the implementation phase and about $25,614 annually after the construction phase ($85,379 x 0.30 = $25,614).

Recreation-related income resulting from hunter expenditures would vary little, if any, as a result of adopting this alternative, since in the long term big game populations would vary only slightly in either direction from present levels (see Wildlife).

Government-related income would not be changed from the level indicated in chapter 3 for the proposed action.

EMPLOYMENT

Additional employment would be generated from contract construction, maintenance, and water hauling activities. Contract construction would generate 4.48 man-years of employment through the construction phase and 0.13 man-year annually thereafter. Water hauling could add a small undetermined amount of employment and road maintenance could add 2 man-years annually.

Because of the indeterminant nature of employment reduction possibilities due to decreases in income in the livestock sector, it is not possible to determine what the net impact on employment from this alternative would be. However, it is possible that a slight increase could occur, at least during the construction phase.

SOCIAL WELL-BEING

It appears that any improvement in social well-being resulting from additional incomes would come largely at the expense of livestock operators who would be required to maintain additional fences and cattleguards and haul water to livestock while facing a situation of reduced incomes. The social well-being of the ES area as a whole would not appear to be improved or worsened, even though the well-being of some area livestock operators would be worsened. All permittees of allotments facing reductions would face reduced grazing of varying degrees as indicated in table 8-25, with two operators facing class changes (from sheep to cattle grazing) which could force them to go out of business.

PUBLIC FINANCE AND TAX BASE

Public finance and tax base would not be altered from that level of change indicated for the proposed action, since allowable AUM use would not change from the proposed action level (40,479).

SOCIO-CULTURAL VALUES

It appears that adopting this alternative would create conflict with local attitudes and values since it would greatly inhibit self-deterministic options of area livestock operators and appear to violate the desire of local residents in general for economic growth and range improvements which would benefit livestock operators. Considerable resentment and opposition could be expected from livestock operators who would be required to assume additional operating costs with no apparent gains.

ALTERNATIVE E: ELIMINATION OF GRAZING ON ALLOTMENTS WITH SOILS IN SEVERE AND CRITICAL EROSION CLASSES

Description

Alternative E would have the following components:

1. All but eleven allotments would be the same as under the proposal (396,180 acres).
2. Livestock grazing would be eliminated on 83,085 acres on the following allotments which have lands in the severe and critical erosion condition classes: 4022 Petrie Mesa, 4506 Oak Mesa, 4513 Stevens Gulch, 4535 Home Place, 4536 West Young's Peak, 5003 Selig Canal, 5008 Brush Point, 5030 Bostwick Park, 5507 Pipeline, 5520 Lower Horsefly, and 5561 East Fork.
3. Unallotted status (no livestock grazing) would be continued on 45 tracts (13,550 acres).

Implementation of the AMPs would require the range improvements and vegetation conversions summarized in table 8-26. Design features for these projects would be the same as for those described in chapter 1. Table 8-27 shows expected acres disturbed by the proposed improvements and land treatments with this alternative.

TABLE 8-26
ALTERNATIVE E: PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
4001 Dominguez	40.5 mi.	2.5 mi. Trail	35.0 mi.	6	5	-	6	44	7,445 ac. C&S
4002 Lower Escalante	-	-	-	-	-	-	-	4	-
4010 Monitor Mesa	10.0 mi.	0.5 mi. Trail	3.0 mi.	-	2	10 1 Catchment	1	17	2,045 ac. C&S
4016 Wells Gulch	-	-	19.5 mi.	2	-	-	2	23	-
4017 Alkali Flats	6.0 mi.	-	2.0 mi. 2 Water Taps	-	-	-	-	4	-
4024 Dirty George	3.0 mi.	1 Stock Bridge	-	-	1	1	-	2	-
4025 Ward Creek-Doughspoon	11.0 mi.	-	11.0 mi.	-	1	-	-	16	900 ac. C&S
4504 Leroux Creek	4.5 mi.	0.5 mi. Trail	2 Water Taps	-	5	4	-	19	310 ac. C&S
4507 Jay Creek	16.0 mi. 1 Corral	- -	7.5 mi. -	- -	4 -	3 -	- -	18 -	2,655 ac. C&S 95 ac. IS
4516 North Fork	31 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4517 Coal Gulch	-	-	0.5 mi.	-	1	2	-	4	-
4525 Anthracite Creek	0.5 mi.	-	-	-	2	2	-	5	-
4527 Jumbo Mountain	4.0 mi.	1.0 mi. Trail	1.5 mi.	-	1	5	-	8	660 ac. C&S 400 ac. IS
4532 McDonald Ranch	58 Boundary Posts & Signs	-	-	-	-	-	-	-	-
4540 North Saddle Peak	0.5 mi.	-	-	-	-	-	-	-	-
5010 Dead Horse	3.5 Mi.	-	-	-	-	-	-	-	-
5011 Gould Reservoir	-	-	-	-	-	5	-	5	-
5013 Iron Canyon	-	-	-	-	-	5	-	5	-
5014 Poison Spring	-	-	-	-	-	2	-	2	-
5015 Grizzly Gulch	4.5 mi.	-	-	-	-	4	-	4	-
5016 Black Canyon	-	-	-	-	-	-	-	-	80 ac. C&S

a/ Key to Vegetation Conversion: C&S = chaining and seeding; IS = interseeding.

TABLE 8-26
ALTERNATIVE E: PROPOSED IMPROVEMENTS FOR EACH ALLOTMENT OR ALLOTMENT SUBUNIT (cont.)

Allotments & Subunits	Fences, Cattleguards	Trails, Stock Bridges	Pipe-lines	Wells	Springs	Reservoirs, Catchments	Storage Tanks	Water Troughs	Vegetation Conversions a/
5017 Green Mountain	5.5 mi.	-	-	-	-	16	-	16	505 ac. C&S
5020 Black Ridge	7.0 mi.	-	6.0 mi.	-	-	3	1	10	800 ac. C&S
5028 Doug Creek	1.5 mi.	-	-	-	-	-	-	-	-
5502 Sandy Wash	-	-	8.0 mi.	-	-	-	-	8	-
5504 Roatcap	3.0 mi.	-	6.0 mi.	2	-	-	2	8	-
5508 Government Springs	5.0 mi. 2 Cattleguards	1.0 mi. Trail	-	-	-	6	-	6	-
5511 Shavano Mesa	-	-	-	-	-	-	-	-	1,120 ac. IS
5512 Franklin Mesa	-	-	-	-	-	-	-	-	1,000 ac. IS
5513 Dry Creek Basin	-	-	-	-	-	-	-	-	1,000 ac. IS
5518 Dave Wood	13 Boundary Posts	-	-	-	-	-	-	-	600 ac. C&S
5522 Beaver Hill	10 Boundary Posts & Signs	-	7.5 mi.	3	-	-	3	11	150 ac. C&S
5523 Horsefly	3.0 mi.	-	-	-	-	3	-	-	400 ac. C&S
5529 Log Hill	5.0 mi. 1 Cattleguard	-	3.5 mi.	1	-	-	1	4	2,300 ac. C&S
5530 Billy Creek	2.0 mi. 2 Cattleguards	-	-	-	-	5	-	-	-
5540 Dry Gulch	4.0 mi.	-	-	-	-	-	-	-	-
5562 Hillside	1.0 mi.	-	0.5 mi.	-	-	1	-	2	-
5568 Baldy	-	-	-	-	1	1	-	2	-
5570 Cedar	7.0 mi.	-	2.0 mi.	-	1	-	-	2	-
TOTALS	148 mi. fences 112 boundary markers 5 cattleguards 1 corral	5.5 mi. trail 1 stock bridge	113.5 mi. 4 water taps	13 vert.	24	73 1 catchment	16	249	18,850 ac. C&S 3,615 ac. IS

TABLE 8-27
ALTERNATIVE E:
EXPECTED ACRES DISTURBED BY PROPOSED RANGE IMPROVEMENTS

Range Improvement	Unit	Total	Acres Disturbed per Unit		Total Acres Disturbed	
			Short-term a/	Long-term b/	Short-term a/	Long-term b/
WATER DEVELOPMENTS						
Vertical Wells	No.	13	0.2	0.2	2.6	2.6
Springs	No.	24	0.2	0.2	4.8	4.8
Catchments	No.	1	1.0	0.5	1.0	0.5
Reservoirs	No.	78	1.0	0.1	78.0	7.8
Pipelines	Mi.	113.5	0.2	-	22.7	-
Water Taps	No.	4	0.03	-	0.1	-
Storage Tanks	No.	16	0.2	0.2	3.2	3.2
Water Troughs	No.	249	0.1	0.001	24.9	0.2
FENCES						
Fences	Mi.	148	1.0	0.002	148.0	0.3
Corrals	No.	1	0.5	0.5	0.5	0.5
Boundary Markers	No.	112	0.1	-	11.0	-
OTHER PROJECTS						
Cattleguards	No.	5	0.1	0.004	0.5	0.02
Stock Trails	Mi.	5.5	1.5	-	8.3	-
Stock Bridges	No.	1	0.1	0.1	0.1	0.1
VEGETATION CONVERSIONS						
Chainings & Seedings	Ac.	18,850	1.0	-	18,850.0	-
Interseedings	Ac.	3,615	1.0	-	3,615.0	-
TOTALS					22,770.7	19.92

a/ Short-term means at least eight years from the present, which covers the period of implementation.
b/ Long-term means at least twenty years after full implementation or twenty-eight years from the present (i.e., 2006).

Analysis

Soils

The impacts on soils for all allotments but the eleven (396,180 acres) would be the same as for the proposed action, which predicts a decrease in runoff and sediment yield from the large storms. There would be no quantifiable changes in soils except for the changes in erosion condition classes as shown in table 8-29 (summary table at the end of chapter 8). The impacts on soils for the eleven allotments eliminating grazing (83,085 acres) would be the same as for Alternative B in this chapter.

Water Resources

The impacts on soils for the eleven allotments eliminating grazing (83,085 acres) would be the same as for Alternative B in this chapter. The remainder (396,180 acres) would be the same as the proposed action, which estimates the long-term impact would be a net decrease in runoff volumes and peak discharges for larger storms (see table 3-5). Impacts on ground charge water would be insignificant, and there would be immeasurable decreases in sheet and channel erosion.

Vegetation

Short-term and long-term impacts on vegetation would be the same as discussed in chapter 3 on the allotments other than those eleven which would receive elimination of grazing under this alternative. Refer to chapter 3 for a discussion of the expected short-term and long-term impacts on vegetation resulting from elimination of grazing in the ES area. These impacts would apply to the eleven elimination of grazing allotments under this alternative. A summary of the cumulative long-term impacts of this alternative appears in table 8-28.

Improvements constructed for the AMPs under this alternative would initially disturb approximately 305.7 acres of vegetation and remove approximately 19.92 acres from permanent production (refer to table 8-27). An estimated 2 AUMs of forage annually would no longer be available from these permanently disturbed acres.

Impacts to the proposed endangered plants would be the same as for the proposed action. They could be mitigated as outlined in chapter 4.

Wildlife: Terrestrial

Under this alternative, impacts on wildlife would be the same as those listed in chapter 3, except for the eleven allotments which are additionally proposed for elimination of grazing. On these allotments, competition with livestock would be eliminated. Three of the eleven allotments are in deer crucial winter range (4506 Oak Mesa; 4513 Stevens Gulch; and 5003 Selig Canal, subunit T Rawhide-Coffeepot), and two of these (4506 Oak Mesa and 4513 Stevens Gulch) are in elk crucial winter range. For a discussion of the kinds of short-term and long-term impacts which would occur on wildlife in these eleven allotments refer to Alternative B in this chapter.

Overall, the numbers of mule deer and elk would be expected to increase under this alternative, although the increase would be slightly less than under the proposal. Antelope population numbers would be expected to increase to the level set forth under the proposed action.

Impacts on small mammals and birds would be the same as under the proposed action.

Wildlife: Aquatic and Riparian

The impacts on aquatic and riparian habitats would be the same as for the proposal except for allotment 5520 Lower Horsefly. This allotment has 2.1 miles of riparian habitat which would be expected to improve from fair to good under this alternative. There would not be any significant changes in the aquatic species.

Recreation

There would be very little difference in recreation values from the proposal.

Agriculture: Livestock Grazing

Under this alternative, there would be a short-term reduction in present active licensed use of 8,006 AUMs (35,369 − 27,363 = 8,006). Annual livestock use by 2006 under this alternative would be 1,411 AUMs less than the present active licensed use (35,369 − 33,958 = 1,411). (See table 8-28.) While AUM use would be expected to increase on the AMP allotments under the proposal, there would continue to be no use on the eleven additional elimination of grazing allotments.

Socio-Economic Conditions

POPULATION

ES area population trends are not expected to be altered by this alternative.

TABLE 8-28
ALTERNATIVE E: LONG-TERM IMPACTS ON VEGETATION AND LIVESTOCK USE

Allotment Name and Number	Present Prod. (AUMs)	Present Active Licensed Use (AUMs)	Alternative Use (AUMs)	Predicted Prod. (2006) (AUMs)	Predicted Use (2006) (AUMs)	Present Range Condition			Predicted Range Condition (2006)			Allot. Acreage
						Good	Fair	Poor	Good	Fair	Poor	
4022 Petrie Mesa	1,430	1,258	-	1,430	-	6,805	-	7,055	6,805	-	7,055	13,860
4506 Oak Mesa	95	64	-	95	-	-	1,350	-	-	1,350	-	1,350
4513 Stevens Gulch	865	694	-	865	-	1,595	4,960	-	1,595	4,960	-	6,555
4535 Home Place	15	15	-	15	-	-	-	160	-	-	160	160
4536 West Young's Peak	10	6	-	10	-	-	160	-	-	160	-	160
5003 Selig Canal	725	330	-	725	-	2,665	-	5,000	2,665	-	5,000	7,665
5008 Brush Point	1,755	1,123	-	1,755	-	1,120	4,650	12,435	1,120	4,650	12,435	18,205
5030 Bostwick Park	380	188	-	380	-	-	1,975	3,520	-	1,975	3,520	5,495
5507 Pipeline	2,270	1,715	-	2,270	-	6,760	5,125	7,305	6,760	5,125	7,305	19,190
5520 Lower Horsefly	965	665	-	965	-	4,630	2,650	3,085	4,630	2,650	3,085	10,365
5561 East Fork	5	14	-	5	-	-	-	80	-	-	80	80
SUBTOTALS	8,515	6,072	0	8,515	0	23,575	20,870	38,640	23,575	20,870	38,640	83,085
OTHER NRL	42,800	29,297	27,363	53,710	33,958	51,415	194,560	196,715	185,790	240,695	16,205	442,690
TOTAL	51,315	35,369	27,363	62,225	33,958	74,990	215,430	235,355	209,365	261,565	54,845	525,775

Note: Refer to tables 3-8, 3-9, and 3-16 for allotment specific information on allotments unchanged from the proposal under this alternative.

INCOME

Active licensed use would be reduced by 8,006 AUMs from the 1975 level to 27,363 AUMs of use annually. This would reduce direct range livestock-related income (1970 dollars) by $23,217.40 (8,006 × $2.90 = $23,217.40) and total direct and indirect range livestock-related income by $34,524.27 ($23,217.40 × 1.487 = $34,524.27). This short-term reduction in total direct and indirect livestock-related income is 0.00529 percent of 1974 ES area livestock-related income and 0.0002 percent of 1974 ES area total personal income.

Over the longer term, total livestock use would increase to 33,958 AUMs annually, still 1,441 AUMs less than current active use levels. Estimated direct and indirect range livestock-related income would thus still be $6,084.65 less (1970 dollars) than at present (1975). For those operators dependent on the eleven allotments affected, no use would be allowed, and the adverse income effects noted above would be concentrated on them.

Since the cost of range-related improvements would be $1,367,682.50, the ES area construction income effect would total $273,536.50 over the implementation period. Construction expenditures and related income effects are approximately 23 percent less than with the proposed action. As a result, ongoing overhead and maintenance income effects would be reduced to about $17,237 annually.

Implementation of this alternative would not change projected increases in big game populations markedly from the proposed action. Thus, hunters' expenditures would increase from between $221,832 to $444,937 (1973 dollars) annually. The annual local income effect would amount to an increase of $44,366 to $88,987.

Government-related income would total about $48,000 in new salaries annually, as with the proposed action.

In summary, the annual long-term income effects would total about $103,629 annually.

EMPLOYMENT

As noted in chapters 1 and 3, four additional government positions would be created when the proposal was initiated, and continue during the operation of the grazing systems. A total of 22.8 man-years of employment would be generated over the implementation period as a result of construction related income (assumes a $12,000 per year salary). Ongoing maintenance functions would generate about 1.44 man-years of employment annually. The wildlife-related (hunting) income would generate between 3.71 and 7.42 additional man-years of employment annually, within twenty years after the proposal is implemented. In summary, following the implementation phase, the employment impacts would range between 9.15 and 12.86 man-years annually.

SOCIAL WELL-BEING

Discussion of employment and income effects in the previous sections suggests a slight improvement in well-being. Range livestock-related sectors would be adversely affected while those associated with construction and service sectors would realize some gains. The net effect would be regionally insignificant but harshly adverse on the affected permittees.

PUBLIC FINANCE AND TAX BASE

This alternative would adversely affect the regional tax base by reducing property values initially by an estimated $667, 120 to $800,592 (8,006 ÷ 12 = 667.12; 667.12 × $1,200 = $800,592; etc.). The actual assessed valuation would be reduced by about $200,136 to $240,177. The lower figure is 0.0023 percent of the 1975 area assessed valuation. This adverse impact would be largely eliminated over time (dropping to $35,274) as vegetative productivity increased and future use levels increased. However, the deficit would never be totally erased since future use would never rise to present levels.

SOCIO-CULTURAL VALUES

Adoption of this alternative would create conflict with local attitudes and values since it would inhibit self-deterministic options. Economic hardship inflicted upon the individual permittees affected would likely generate resentment since apparent gains are small and noneconomic.

SUMMARY

Table 8-29 presents a summary of the impacts of the proposed action as compared with the alternatives.

TABLE 8-29
AGGREGATED ENVIRONMENTAL COMPONENTS COMPARING THE PRESENT SITUATION WITH THE PROPOSED ACTION AND FOUR MANAGEMENT ALTERNATIVES

Resources or Component	Unit	Present Status	Proposed Action (by 2006)	Alternative A: Continuation of Present Grazing Program (by 2006)	Alternative B: Elimination of Grazing (by 2006)	Alternative C: Custodial Management (by 2006)	Alternative D: Reduced Livestock Grazing (by 2006)	Alternative E: Elimination of Grazing on 11 Allotments (by 2006)
Soils								
Erosion condition classes	Acres							
Stable		32,260	+107,925	+25,575	Unknown	Unknown	+109,699	+107,925
Slight		236,998	+100,917	+10,116	Unknown	Unknown	+ 99,498	+ 9,697
Moderate		224,767	-180,602	-30,230	Unknown	Unknown	-182,705	-169,582
Critical		28,320	- 24,810	- 7,289	Unknown	Unknown	- 23,062	Unknown
Severe		3,430	- 3,430	+ 1,828	Unknown	Unknown	- 3,430	Unknown
Vegetation								
Range condition	Acres							
Good		74,990	+147,935	+48,420	+ 0	+29,680	+147,565	+134,375
Fair		215,430	+ 70,535	+16,150	+ 0	+ 6,460	+ 70,905	+ 46,135
Poor		235,355	-210,470	-64,570	+ 0	-36,140	-218,470	-180,510
Production	AUMs	51,315	+ 12,645	- 970	+ 0	- 4,470	+ 12,630	+ 10,910
Wildlife: Terestrial								
Wildlife Use	AUMs	17,998	+ 5,481	+ 0	+ 0	- 1,776 to - 3,552	+ 360 to - 360	+ 4,200
Populations	No.							
Mule Deer		15,000	+ 2,200 to + 4,500	+ 0	+ 0	- 1,500 to - 3,000	+ 300 to - 300	+ 1,685 to + 3,450
Elk		1,200	+ 96 to + 156	+ 0	+ 0	- 120 to - 240	- 24 to + 24	+ 75 to + 120
Antelope		250	+ 53 to + 73	+ 0	+ 0	- 25 to - 50	+ 5 to - 5	+ 53 to + 73
Wildlife: Aquatic & Riparian								
Riparian Habitat	NRL Miles							
Excellent		12.4	+ 5.4	+ 3.4	+ 45.4	- 2.0	+ 20.1	+ 5.4
Good		45.4	- 2.5	- 23.6	+ 15.4	- 13.0	- 2.5	- 0.4
Fair		60.8	+ 16.4	+ 10.3	- 30.1	+ 5.9	+ 13.4	+ 14.3
Poor		30.7	- 17.2	+ 3.5	- 28.6	+ 2.7	- 28.9	- 17.2
Nonexistent		13.5	- 2.1	+ 6.4	- 2.1	+ 6.4	- 2.1	- 2.1
Aquatic Habitat	NRL Miles							
Excellent		19.8	Slight improvement from present condition.	Insignificant improvement from present condition.	Improvement over present condition.	Decline below present condition.	Improvement over present condition.	Slight improvement over present condition.
Good		62.9						
Fair		28.0						
Poor		20.1						
Nonexistent		32.0						
Agriculture: Livestock Grazing								
Livestock Use	AUMs	35,369	+ 5,110	- 1,067	- 35,369	- 1,329	- 7,123	- 1,411

TABLE 8-29
AGGREGATED ENVIRONMENTAL COMPONENTS COMPARING THE PRESENT SITUATION WITH THE PROPOSED ACTION AND FOUR MANAGEMENT ALTERNATIVES (cont.)

Resources or Component	Unit	Present Status	Proposed Action (by 2006)	Alternative A: Continuation of Present Grazing Program (by 2006)	Alternative B: Elimination of Grazing (by 2006)	Alternative C: Custodial Management (by 2006)	Alternative D: Reduced Livestock Grazing (by 2006)	Alternative E: Elimination of Grazing on 11 Allotments (by 2006)
Socio-economic Conditions a/								
Personal income (annual)	Dollars	155,345,000 b/	+136,789 to +181,410	- 4,601	- 104,649 to - 114,249	-38,840 to -71,092	+ 40,284	+103,629
Employment	c/	14,461 b/	+ 9.57 to + 13.28	+ 0	Indeterminate	- 2.69 to - 5.38	+ 7.99	+ 9.15
Tax Base	Dollars	86,608,980 d/	- 5,649	+ 5,649	-1,017,625	- 5,649	- 5,649	- 35,274

a/ The figures under "Present Status" represent varying base years and are presented only for general comparison. The figures presented under "Change by 2006", therefore, represent predicted net changes which are expected to occur annually by 2006.
b/ Base year is 1974.
c/ "Present Status" indicates number of people employed in the ES area in base year 1974; "Proposed Action" and alternative columns indicate predicted annual man-years by 2006.
d/ Base year is 1975.

CHAPTER 9

CONSULTATION AND COORDINATION

Team Organization

This statement was developed by a group of Bureau of Land Management (BLM) professionals with expertise in range management, wildlife, watershed management, geology, forestry, recreation, landscape architecture, soils, hydrology, economics, land use planning, fisheries, archeology, and writing-editing.

A news release was issued on July 1, 1976, stating the BLM's plans for initiating and completing the environmental statement (ES). This release was sent to two TV stations, six radio stations, and eight newspapers in Southwestern Colorado.

Consultation and Coordination in the Preparation of the Draft Environmental Statement

Letters were sent to the following individuals and organizations on July 19, 1976, informing them of the preparation and purpose of the ES on grazing for the Uncompahgre Basin Resource Area.

The Governor of Colorado
Mayors of thirteen cities and towns in the area
Chambers of Commerce in fourteen areas
County Commissioners in five counties
Eight state and federal governmental organizations
Twenty national institutions and school districts
Twenty-seven private groups
One hundred twenty-two individual citizens
Three members of Congressional delegations

The steering committees for the Colorado Cattlemen's Association and the Colorado Woolgrowers were taken on a field trip on July 26 and 27, 1976, to look at the feasibility of some of the proposed AMPs.

A member of the Denver office of the Environmental Protection Agency was taken on a field trip on August 17 to familiarize that agency with the ES area.

The Uncompahgre Horse and Cattle Association was contacted at their annual meeting in Montrose on December 11, 1976.

Louis S. Hall, Assistant Director, Office of Review and Compliance for the Council on Historic Preservation was contacted and his recommendations were incorporated into the text.

Federal and State Contacts

Table 9-1 reflects the number and extent of federal and state agency contacts initiated and the actions completed in preparation of the draft statement. The comments received from the contacts were considered in preparation of this draft. BLM employees discussed the ES with the following groups:

Delta County Commissioners
Paonia Rotary Club
Hotchkiss Kiwanis Club
Paonia Chamber of Commerce
Delta County Planning Commission
Citizen Advisory Groups for H-B 1041
Hotchkiss Chamber of Commerce
Paonia Rod and Gun Club
Delta Phase I meeting
Cedaredge Phase I meeting
Montrose Woolgrowers
Hotchkiss Woolgrowers
Montrose Phase I meeting
Ridgway Phase I meeting
Delta City Council
Delta Rotary Club
Montrose Chamber of Commerce
Paonia High School media class
Montrose Rotary Club
Dolores Chamber of Commerce
Uncompahgre Horse and Cattle Association

Coordination in the Review of the Draft Environmental Statement

Comments on the draft environmental statement were requested from the following agencies and interest groups.

Colorado State Agencies:

- Governor's Clearing House
- Division of Wildlife*
- Division of Planning*

County Commissioners:

- Delta County*
- Montrose County
- Ouray County*
- Gunnison County
- Mesa County

Environmental Protection Agency*

Department of the Interior:

- U.S. Fish and Wildlife Service
- Bureau of Reclamation*
- Bureau of Outdoor Recreation*
- U.S. Geological Survey
- Bureau of Mines
- National Park Service

Department of Agriculture:

- U.S. Forest Service
- Soil Conservation Service

Department of Commerce

Other Organizations:

- Sierra Club
- Colorado Open Space Council*
- Izaak Walton League
- The Wildlife Society
- Colorado Cattlemen's Association*
- Colorado Wool Growers Association
- Audubon Society*
- Natural Resources Defense Council*

TABLE 9-1
FEDERAL AND STATE CONTACTS

Agency	Nature of Contact	Response Received	Action Taken
U.S. Forest Service	Request data assistance for coordination of grazing programs	Yes	Personal contacts provided information
Colorado Game and Fish Dept.	Request data on game populations, areas of use, browse conditions, and fisheries	Yes	Provided information through personal contacts and use of literature
U.S. Soil Conservation Service	Requested data on soils and vegetation	Yes	Furnished data through contact and publications
U.S. Fish and Wildlife Service	Request data on black-footed ferret	Yes	Field check for black-footed ferret sign
Environmental Protection Agency	Request water quality information	Yes	Furnished information from STORET
National Park Service	Request visitor use information	Yes	Furnished data by personal contact and telephone
U.S. Geological Survey	Request ground water information	Yes	Furnished data by telephone
National Climatic Center	Request weather data	Yes	Furnished data requested
Colo. State Dept. of Health	Request air quality data	Yes	Furnished data requested
Bureau of Reclamation	Request water information	Yes	Furnished data requested

Society of Range Management
Wilderness Society
Rocky Mountain Center on Environment
Advisory Council on Historic Preservation*
Institute of Ecology
Trout Unlimited
Colorado Historical Society*

*** Responded with written comments.**

Copies of this draft environmental statement were available for public inspection at the BLM offices listed below.

Washington Office of Public Affairs

18th and C. Streets
Washington, D. C. 20240
Phone: (202)343-5717

Colorado State Public Affairs Office

Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202
Phone: (303)837-4481

Montrose District Office

P. O. Box 1269
Montrose, Colorado 81401
Phone: (303)249-7791

Public Comments and Responses

Copies of the DES were sent to about 300 federal, state, and local government agencies and nongovernment organizations, such as conservation groups, for their review and comment. Notice of availability was published in the September 26, 1977, issue of the Federal Register. The notice announced that the Bureau of Land Management invited written comments to be submitted within 45 days of the notice, or by November 9, 1977. It also included a schedule of formal public hearings to be held at Montrose on November 1, 1977. The Federal Register notice also announced that reading copies of the DES would be made available for public review at the following locations: four Bureau of Land Management offices, four county courthouses, and five public libraries.

All comments were reviewed to determine if they met the established criteria for consideration by the environmental staff analysts in preparation of the final environmental statement (FES). In order to be considered, comments had to discuss the adequacy of analyses contained in the draft. Thus, comments which presented new data, questioned facts or analyses, and raised questions or issues bearing directly upon the DES were fully considered and evaluated. Such substantive comments were then assigned to environmental staff analysts for evaluation and for subsequent changes or insertion in the text of the FES, where necessary. All similar comments were summarized and answered as one comment.

Letters which were general or vague or which did not contain substantive comments were reviewed, but no response was generated. Editorial comments (dealing, for example, with grammatical errors or small errors in information), if not substantive, were also not responded to, although appropriate text changes were made.

A federal Administrative Law Judge presided over the hearings, which were recorded verbatim by a court reporter. Copies of the full transcripts of the hearings were made available for public review at the BLM's Colorado State Office, and the Montrose District Office. Witnesses presented testimony to a three-member panel consisting of staff from the Bureau of Land Management, including the Chief of the Division of Environmental and Planning Coordination (Colorado State Office, BLM), Chief, Division of Resources (Colorado State Office, BLM), and the Montrose Assistant District Manager (BLM). Figure 9-1 summarizes the hearings' location and date, the number in attendance, and the number of witnesses. The full transcript of the hearings is not reproduced in the exhibits due to its length.

All written comments and the hearing transcript have been sent with the FES to the Secretary of the Interior and the Environmental Protection Agency for review and are also available for public inspection at the State Director's Office, Bureau of Land Management, Colorado State Bank Building, Denver, Colorado.

The remainder of this chapter lists substantive comments and matching responses. Some of these comments were advanced by more than one commenter; these were representatively paraphrased and appear in the section immediately following, in which comments are arranged by subject. Each commenter has been assigned a number to reference contributions under each subject heading. All letters from government agencies, environmental groups, and recognized authorities are reproduced in appendix 13, Actual Comment Letters. Comment letters received are listed in figure 9-2.

Where a witness testified orally and then submitted a lengthy exhibit as the full statement, only the full statement has been answered. However, these written statements received at the hearing have not been published. Comments which were ambiguous or for which no specific reply was

Location	Date and Time	Attendance	Number of Witnesses
Montrose, Colorado	11-1-77 1 pm	31	6
Montrose, Colorado	11-1-77 7 pm	10	0

Figure 9-1. Formal public hearings

Commenter Number	Agency, Organization, or Individual
1.	C. Wayne Cook
2.	City of Montrose
3.	M.S. Wilson
4.	Uncompahgre Livestock Association
5.	Cecil Billingsley
6.	Audubon Society of Western Colorado
7.	Wilderness Workshop of Colorado Open Space Council
8.	William E. Bray
9.	Warren Comerer, Ouray County Commissioner
10.	Natural Resources Defense Council, Inc.
11.	Wayne A. Gore, Delta County Commissioner
12.	Musser Ranches
13.	Office of the State Archaeologist (Colorado)
14.	Bernice Musser
15.	Edwin Jacobs
16.	USDI, Bureau of Outdoor Recreation
17.	Colorado Division of Planning, Department of Local Affairs
18.	Colorado Division of Water Resources
19.	State Historical Society of Colorado
20.	Colorado Division of Wildlife
21.	USDI, Bureau of Reclamation
22.	Environmental Protection Agency
23.	Advisory Council on Historic Preservation

Figure 9-2. Comment letters received

deemed necessary have not been addressed. Individuals testifying at the hearings are listed in figure 9-3.

Soils and Watershed

1. Commenters Numbers 11, 24, and 25

Comment: The statement on page 3-12 of the DES that "soils with relatively high initial infiltration rates would have a net decrease, probably due to compaction during spring and summer grazing (40,408 acres)," is unfounded. Soil is compacted in feedlots but not on native range with limited carrying capacity except when soil may be excessively wet in early spring. Even this effect is minimized annually through freezing, thawing, and heaving in the soil.

Response: Infiltration studies have been conducted since the early 1930s. Through the years, many experienced researchers have concluded that the primary factors affecting infiltration-capacities are: (1) surface organic matter content, (2) subsurface organic matter content, (3) clay content, and (4) noncapillary porosity (e.g., Free, Browning, and Musgrave 1940; Bodman 1936; Whipkey 1966; and Krammes 1969). Of these, noncapillary porosity was found to be the most important. Any grazing intensity affects infiltration by decreasing the soil porosity, vegetative cover, and surface organic matter or litter. Continued heavy grazing will decrease the soil porosity beyond the frost line, and thus the natural effects of frost heaving as a corrective measure are lost. This in turn initiates the new variable of "time" for the natural corrective process (Lusby 1963, 1965, 1970, 1971; Dortignac and Love 1961; Thompson 1968; Orr 1962; Branson 1962; Sartz and Tolsead 1974; Buckhouse, unpublished data; Busby, unpublished data). In addition, the loss of vegetative cover, both dead and living, increases the soil compaction potential by raindrop impact. This too is a very significant adverse impact (Gunn and Kinzer 1949; Laws 1941; Mihara 1952; and Rubenzer 1970).

A table summarizing grazing intensity-infiltration studies has been added to appendix 3 in the FES. The table is taken from Gifford and Hawkins, in press, "Hydrologic Impact of Grazing: A Critical Review," accepted for publication by Water Resources Research, which summarizes the studies and data used in the development of the Gifford and Hawkins grazing model.

2. Commenters Numbers 11 and 25

Comment: On page 3-11 (DES), "heavy grazing" and "moderate grazing" for hydrological purposes were very poorly defined. Time must be considered when defining grazing intensity.

Response: The terms "heavy grazing" and "moderate grazing" could not be defined more precisely because the "state of the art" has not produced a better definition.

The model used on page 3-11 (DES) represents the best available tool at this time. Many of the studies conducted in the western United States that were used in the development of this model did not differentiate among their terms of "no grazing," "moderate grazing," and "heavy grazing" either. For this reason, the ES team could not impose numerical limits upon the unknown boundaries of these studies. By using the definitions given, the benefit of doubt can be given to the other researchers, ranchers, and government employees who wish to use this model. These terms are relative to one another. Variations in soil properties and vegetation can create large differences in numerical limits from one area to another. As these variations and effects become known, this model can be upgraded. Also, because the terms are relative to one another, "time" is an integral part of the model. The time is dependent upon the grazing system. If the allotment is grazed for a period of three weeks, then "moderate grazing" is the amount of grazing, and thus trampling, that occurs over a three-week period throughout the entire allotment. "Heavy grazing" then refers to the amount of trampling that occurs over a three-week period in a single pasture within the allotment being discussed. In both situations the same number of animals are in use over the same period of time with the difference occurring in the size of the area being grazed.

3. Commenter Number 1

Comment: I challenge the formulae on page 3-13 (DES) which show that fair condition range or medium grazing gives identical infiltration or runoff patterns. Furthermore, they only account for 63 percent of the variation in Y, so the entire calculation is not a good estimate of infiltration rate. Besides it would depend upon soil texture and degree of slope, neither of which have been considered. The same is true for infiltration rate for poor range condition or heavy grazing. Certainly

Commenter Number	Speaker	Representing
24.	Lawrence Phelps	Colorado Cattlemen's Association
25.	Bob Hyde	Self
26.	Nick Theos	Public Lands Council, National Cattlemen's Association, National Woolgrowers Association
27.	Neil Reams	Montrose County Commissioners
28.	George Volk	Delta County Livestock Association
29.	Jim Flowers	Uncompahgre Livestock Association

Figure 9-3. Individuals testifying at hearings, Montrose, Colorado, November 1, 1977

the cover and surface soil condition are not the same for heavy grazing in one case and poor condition range in another.

Response: The 63 percent represents the "state of the art" of the relationship between grazing and infiltration. The data used to obtain this coefficient were taken from many soil types, vegetation types, and data collection methods throughout the western United States. There are many variables that affect infiltration rates, including the amount of subsurface organic matter (0.40), surface organic matter (0.50), clay content (0.42), and most importantly, noncapillary porosity (0.54) (Free, Browning, and Musgrave 1940). As more data are collected and analyzed, this model may be updated or a completely new one may be developed.

4. Commenter Number 22

Comment: The summary on page 3-18 (DES) states that there would be no decrease in erosion resulting from the proposed range improvement program. If cover improves, erosion should decrease. This statement should be corrected or clarified.

Response: There would be a decrease in erosion. The summary states that the amount is unknown.

5. Commenter Number 22

Comment: The range improvement program includes water developments. To what degree will these water developments affect local water supply and water quality?

Response: The number and type of water developments planned would have an insignificant effect on local water supply and water quality.

6. Commenter Number 22

Comment: The ES fails to mention the possibility of violations of the State Water Quality Standards or the state's nondegradation clause as these relate to the proposed grazing activities. For example, the ES mentions that up to 30,000 acres may be improved through chaining. What are the short- and long-term implications for water quality from this activity?

Response: Studies have shown that chainings have very little effect on water quality (Gifford and Tew, "Evaluating Rangeland Water Quality with Small Plot Infiltrometers," *Journal of Soil and Water Conservation*, 1969, pp. 65-67). Generally, during the first two years there would be less runoff, and after that runoff would remain about the same.

Vegetation

1. Commenters Numbers 11, 24, and 25

Comment: Pages 8-30 and 8-31 (DES) contain opposite assumptions about what would happen if grazing were eliminated. This contradiction should be corrected. Water Resources, page 8-30, assumes that if grazing were eliminated there would be a tremendous increase in vegetation growth resulting in increased infiltration, reduced evaporation, decreased runoff, etc. Page 8-31, last paragraph, assumes that game numbers could increase beyond their carrying capacity to the point of decreased habitat suitability with irreparable range deterioration.

Response: Both Water Resources (page 8-30, DES) and Wildlife: Terrestrial (pages 8-31 and 8-32, DES) assume an increase in vegetative growth, although not a "tremendous increase" as suggested in the comment. (See Vegetation, page 8-31, DES, for a discussion of likely increases.) However, Wildlife: Terrestrial goes on to discuss two possible sets of long-term impacts resulting from this increased vegetation. (1) The last paragraph on page 8-31 (DES) discusses the impacts expected to occur if the DOW does not increase hunting seasons or bag limits to compensate for increased wildlife populations. In that case, the increase in vegetation would not, over the long term, keep up with wildlife increases. (2) The first paragraph on page 8-32 discusses an alternative set of long-term impacts, which could be expected if the DOW does increase hunting seasons and bag limits. In that case, game numbers would not increase above the carrying capacity of the range. The text has been revised to clarify the above assumptions for the FES (chapter 8, Alternative B, paragraphs 2 through 4 of Wildlife: Terrestrial).

2. Commenters Numbers 24 and 25

Comment: On page 1-18 (DES), the proposed grazing treatment dates for grazing, resting, etc., are too specific. I would hope in practice there would be some latitude to account for annual vegetation growth differences.

Response: The dates are typical dates, as stated on page 1-18 (DES). Flexibility is allowed in accordance with BLM Manual 4112.15C3b: "'The plan outlines the normal grazing operation as to numbers and seasons of use. The user may be allowed flexibility in turnout and removal dates and number of livestock so long as use is made within the specific framework of the AMP. Such ar-

rangements must be explicitly described in the AMP to prevent misunderstanding and to ensure that Bureau responsibilities are not neglected."

3. Commenter Number 1

Comment: On page A-28 of the appendices (DES), why are 1963 range survey data used for condition and trend analysis? Why not 1975 or later analysis that would be more meaningful?

Response: Page A-28 (DES) refers to predicted production analysis and not condition and trend analysis. Range condition and trend analysis (page A-24, DES) used 1975 and 1976 data.

4. Commenter Number 1

Comment: On page 8-31 (DES), why quote McLean and Tisdale, who did their work in Canada and thus would be a far-fetched comparison with the Uncompahgre Area concerning vegetation recovery?

Response: The use of McLean and Tisdale's study is explained in chapter 3, under Vegetation, page 3-19 (DES), column 2, paragraph 4.

5. Commenter Number 6

Comment: The following statements in the summary (page iii, DES) seem to be inconsistent:

1. "Vegetation would improve in quantity and quality."

2. "Reduced vegetative vigor and reproduction due to spring and summer grazing." Does this mean that in the short term they will increase the intensity of the spring and summer grazing? Or that spring and summer grazing will be discontinued? Or that some range will be sacrificed (temporarily) in order to improve others? In sentence 2, the word "short-term" is used; I don't believe that you mean by that the grazing year or just one grazing cycle.

Response: Short-term means eight years or less, i.e., the time of implementation. There is now some spring and summer grazing on the same land every year which does reduce vigor and reproduction but which will be compensated for as the grazing systems are put into operation. When the grazing systems are in operation and rest periods are provided for the range during the spring and summer period, then the vegetation would start to "improve in quantity and quality".

6. Commenters Numbers 1, 11, and 25

Comment: Page 3-18 (DES), states that "Grazing any time during the green period of plants reduces the amount of food made and stored by the plants. This reduction in turn decreases the plants capacity to produce both shoot and root growth the following growing season (Hormay 1970)." These sentences were originally written to help substantiate rest rotation grazing. Many pieces of literature indicate that from 30 to 50 percent of green top growth may be removed without detrimental effect on next year's total production. Similarly, on page 3-48 (DES), spring grazing of 30 percent utilization does not harm desert ranges, and grazing foothills and mountain brush ranges at 40 to 50 percent does not cause lowered plant vigor or cause range deterioration (Cook 1971 and Cook 1966). "Development and Use of Spring Ranges in Utah" (Bulletin 461) and annual reports at San Juan Basin on mountain brush range do not agree with your statements on use and range deterioration. If the seasons are rotated among years twice, this use can be made without damage to the range.

Response: The statements about spring grazing on pages 3-18 and 3-48 (DES) do not consider utilization but are only stating a principle. The statement on page 12 of "Carbohydrate Reserves in Plants" (C. Wayne Cook 1966) states the same principle: "In early spring, the plant may be without leaves and therefore depends upon stored reserves, synthesized the previous summer to produce new photosynethetic tissue. By the time the plant has made sufficient aerial growth to manufacture more food than is required for growth and sustenance, a major portion of the reserves may have been used. If the plant is defoliated at this stage, food manufacture is almost nil until new growth restores the photosynthetic tissue (figure 2). In this case, the plant must draw again upon reserves or grow at a slower rate within the ability of the remaining photosynthetic tissue to furnish food. If the carbohydrate reserves are exhausted by previous defoliation, food to supply both the tops and roots must be manufactured by new leaves. Growth dependant on the limited photosynthetic tissue is thus severely reduced." These statements are made to show the effects of each of the treatments by themselves. The fourth full paragraph on page 3-48 (DES) tells why the treatments should not be evaluated by themselves.

7. Commenter Number 20

Comment: On page 3-18 (DES), paragraph 2, right side of page, mention should be made of results of the Mesa Verde browse study (Sheperd 1971, 89-94), especially since the environment of this study is closely comparable to much of the resource area in elevation, vegetation, climate, and other features.

Response: A brief reference to the results of the Sheperd study has been added to the FES (chapter 3, Vegetation, paragraph 4 of Grazing Management). The Sheperd study has also been included in the bibliography of the FES.

8. Commenter Number 21

Comment: On page 3-47 (DES), the discussion of the action on endangered plant species (proposed) raises more questions than it answers; for example, such statements as the ". . . proposed action could be detrimental to *Echinocereus triglochidiatus* var. *inermis*" and ". . . would be harmful to *Penstemon retrorsus* populations in that their critical habitat would be disturbed," should be expected so that the reader can know if the proposed actions are a threat to the continued existence of these species.

Response: The discussion on endangered plants has been rewritten and should be clearer in the FES (chapter 3, Vegetation, paragraphs 2 and 4 of Endangered Plants).

Terrestrial Wildlife

1. Commenter Number 7

Comment: No source listings or explanations are given for the statement that "grazing diversifies vegetation types" in accordance with the edge effect and bird populations (page 8-32, DES). Does the act of grazing areas itself help create more edge, or does the management of grazing areas (by range manipulation) help create edge? The first alternative seems unlikely at best, and the latter seems improbable due to the increase in monotypic vegetation stands created by range manipulations.

Response: The text has been revised (FES, chapter 8, Alternative B, Wildlife: Terrestrial, paragraph 2 under Birds).

2. Commenter Number 20

Comment: In table 8-8, on page 8-21 (DES), it is difficult to understand how ranges in good condition can be increased by 65 percent and those in poor condition decreased by 27 percent under Alternative A without some benefit to wildlife.

Response: The table refers to livestock range. Good livestock ranges are not necessarily good wildlife ranges. See discussion of impacts on browse under Wildlife: Terrestrial, page 8-14 (DES).

3. Commenter Number 20

Comment: On page 8-26 (DES), it is difficult to comprehend how hunter success ratios would decrease under Alternative A when wildlife populations are predicted to remain constant.

Response: The statement assumes that hunters would continue to increase as predicted. More hunters with the same amount of game would probably decrease hunter success. The text has been revised for the FES (chapter 8, Alternative A, Recreation).

4. Commenters Numbers 1, 11, and 25

Comment: The statement on page 3-58 (DES), under Mule Deer, that searching for new shoots exhausts does' energy and causes them to abort the fetus is without foundation. There are no data, for either domestic or wild animals, to substantiate that animals searching for green shoots abort their young. The U.S. Department of the Interior (1974) reference does not present data that support such contention but merely presupposes that such takes place.

Response: Abortion is not mentioned in the DES. However, the statement has been changed in the FES to "the resorption of fetuses in pregnant does" (chapter 3, Wildlife, Terrestrial, paragraph 1 under Big Game). Only the possibility is suggested; it is not a statement of known fact.

5. Commenter Number 1

Comment: On page 5-3 (DES), wildlife forage would be reduced around watering troughs because of livestock concentration. Why just around water holes? Chapter 3 indicates that this would happen all over the range.

Response: It is well known that livestock concentrate around water holes and tend to overuse the areas. The reduction of wildlife forage on areas of range other than around water holes would be mitigated through grazing management systems. Chapter 5 indicates net impacts, after mitigation.

6. Commenter Number 7

Comment: As an endangered species, the black-footed ferret should rate a more thorough study to determine whether it is dwelling inside the ES

area. S. J. Bissel's adamant statement (page 2-66, DES) is a negativistic approach to the problem. Potential habitat should be looked upon as essential until it is proven that no ferrets live in the area. Only then should any kind of development that may disturb this habitat be allowed to take place.

Response: Studies will continue to be made of prairie dog towns. No development that would disturb prairie dog towns is proposed.

7. Commenter Number 1

Comment: On page 3-61 (DES), there are no data showing that if 1,800 pounds of plant biomass are produced and 600 pounds are removed by livestock that small animal populations are reduced. In fact there are more studies showing that rabbits are more abundant on overgrazed ranges than on ungrazed ranges.

Response: The text has been modified to refer to the generality of the facts presented without reference to a specific species (FES, chapter 3, Wildlife, Terrestrial, paragraph 2 under Small Mammals). The range of small mammals included in this section includes all small mammalian species.

8. Commenters Numbers 11, 24, and 25

Comment: There are several unsubstantiated statements on page 3-61 (DES) about the bad aspects of livestock grazing. The impacts of livestock grazing on small mammals is overstated. The statement, "'The porcupine in particular is dependent upon shrubs and trees that may be affected by grazing," is exaggerated and should be omitted. I have seen no studies relating grazing intensity to porcupine density. There is so much variability in small mammal response to livestock grazing that the repeated implication that livestock grazing is universally detrimental, just isn't true. Some small mammals tend to increase as vegetation is grazed. The prairie dog is a case in point. Their habitat preference is an area closely grazed so they can observe potential predators.

Response: There is considerable variance in small mammal response to grazing. The intent here was to show a "worst case" situation. In addition, Flinders and Hansen (1975) state that cottontails and jack-rabbits "are potential competitors with other wild herbivores and cattle for forage." In relation to the prairie dog, benefits derived from grazing are discussed in the DES chapter 8, Alternative B, page 8-32, column 2, paragraph 1, and in the section in the DES chapter 3 on endangered species, page 3-63, column 2, paragraph 2.

9. Commenter Number 6

Comment: The following statements in the summary (page iii, DES) seem to be inconsistent:

1. ". . . resulting in population increases (of terrestrial wildlife) . . ."
2. ". . . increased wildlife-livestock competition on crucial winter ranges"

Does wildlife refer to deer only? How can you increase the deer population by reducing the amount of critical winter range? It sounds like you will be improving the range by reducing spring and summer vigor.

Response: "Wildlife" refers to all terrestrial wildlife populations. The statement does not refer to reducing the amount of crucial winter range. While wildlife-livestock competition would increase on some parts of crucial ranges, other parts would be rested completely from livestock use, and there all forage would be available for the wildlife.

10. Commenters Numbers 11, 24, and 25

Comment: On pages 1-46 to 1-48 (DES), it is important to realize that large numbers of deer and elk graze on deeded land during the critical winter period. Management decisions on public land that may force ranchers to intensify grazing pressure on deeded land could be very damaging to big game winter range, i.e., livestock grazing forage normally left for big game use.

Response: A statement about deeded land has been added to the FES chapter 3, Wildlife, Terrestrial, paragraph 11 under General Impacts.

11. Commenter Number 7

Comment: Concerning the chaining proposals for the ES area, bird habitats are to be left as "blocks of sufficient size" (DES, page 3-63) for the provision of breeding bird species. However, the terms are not defined, so a decision concerning the chances of bird survival in chained areas cannot be made.

Response: Current BLM standards for chainings require leaving blocks of unchained pinyon-juniper no smaller than 40 acres. Weins and Dyer (1975) recommended 1 to 2 square kilometers (250 to 500 acres) and no smaller than 5 hectares (12 acres). The above statement has been added to the FES, chapter 3, Wildlife, next to last paragraph of Other Nongame Birds.

12. Commenter Number 7

Comment: The potential conflicts between domestic stock grazing and big game calving grounds have not been thoroughly studied in the DES. Calving grounds are of primary importance to big game animals, and disruption of these animals through competitive grazing during calving is very detrimental to these wildlife populations. This potential problem should be dealt with and any conflicts resolved in the final draft of the ES.

Response: Three allotments are within elk calving areas: 5547 Slagle Pass, 5549 High Park, and 5566 Cow Creek. None of these allotments is scheduled for livestock grazing until after the peak of elk calving, which is approximately May 15 to June 15, as determined by DOW in "Guidelines for Big Game Season Recommendations."

13. Commenter Number 20

Comment: The assumption made on page 8-31 (DES) that the DOW would not increase hunting opportunity is probably erroneous.

Response: The assumption was intended to apply to only one set of possible long-term impacts, those discussed in the last paragraph on page 8-31 (DES), which presents a "worst-case" analysis. An alternative set of long-term impacts resulting from increased hunting opportunities is discussed in the first paragraph on page 8-32 (DES). The introductions to these two paragraphs have been rewritten for the FES to clarify the assumptions used in each analysis (chapter 8, Alternative B, paragraphs 2 through 4 of Wildlife: Terrestrial).

14. Commenter Number 20

Comment: Page 3-62 (DES), Upland Game Birds: In addition to enhancing sage grouse, water developments could also benefit chukar partridge. In fact, in those instances where water is a limiting factor, water developments could extend the range of the chukar.

No mention is made here of possible adverse impacts on sage grouse from manipulation of sagebrush vegetative types. Perhaps such projects are not contemplated.

Response: A paragraph on chukar benefits has been added to the FES (chapter 3, Wildlife, Terrestrial, paragraph 3 of Upland Game Birds). No manipulation of sagebrush vegetative types has been proposed.

15. Commenter Number 7

Comment: We feel that several areas bordering on the Uncompahgre National Forest, notably areas 4010 (Monitor Mesa) and 4012 (Canal), have potential for wilderness designation. Under the ES proposal these areas would be developed such that this potential would be lost.

Response: No projects will be developed in the Monitor Mesa (4010) and Canal (4012) allotments within the Camel Back roadless area you are concerned with until these lands have been studied for their wilderness suitability and a determination has been made about their qualifications and designation. If these lands are set aside as wilderness, then the allotment management plans will be reevaluated and changed appropriately to conform to the Federal Land Policy and Management Act of 1976. The FES text has been revised to include discussion of the Camel Back area: chapter 2, Recreation, paragraph 5 of Bureau of Land Management section; chapter 3, Recreation, Areas Managed for Recreational Values, Camel Back Area added after Dominquez Creeks Area; chapter 4, Mitigating Measures, item 5.

16. Commenter Number 20.

Comment: The assumption on page 8-32 (DES) that elk would replace deer under Alternative B because of a difference in food habits is questionable. Although elk depend more on grass than deer for winter forage, an estimated (Burdick) 40 to 50 percent of the winter diet of elk is made up of browse in this area. The cause-and-effect relationship expressed in the last paragraph in the left hand column is completely erroneous and therefore should be deleted. Deer numbers have declined elsewhere where elk are not present and elk have increased elsewhere where these species don't share common ranges.

Response: The section referred to has been rewritten for the FES (chapter 8, Alternative B, Wildlife: Terrestrial, paragraph 7). It must be kept in mind that this section refers to discontinuance of livestock grazing and assumes no expanded hunting seasons to control big game numbers.

17. Commenter Number 20

Comment: The Billy Creek Allotment has been in nonuse as far as livestock use is concerned for several years and the DOW would prefer that this status be maintained rather than the rest rotation grazing plan suggested by BLM under the proposed action.

Response: The rationale for proposed reintroduction of grazing on the Billy Creek Allotment is as follows. The proposed Billy Creek AMP is a combination of three existing allotments plus public land on which livestock grazing was eliminated approximately twenty years ago. The acreages total as follows: Chaffee Gulch, 625 acres NRL; Billy Creek, 1,310 acres NRL; Lower Chaffee Gulch, 305 acres NRL, plus 1,755 acres NRL on which livestock grazing was previously eliminated. Grazing qualifications for the three existing allotments total 150 AUMs (active); there are no grazing privileges available for the additional 1,755 acres of NRL. The proposed AMP would combine all of these parcels of land into one management plan with initial livestock use set at 137 AUMs annually (13 AUM reduction from present active licensed use). The proposed AMP would also include implementation of a three-pasture, three-treatment rest rotation grazing system. The BLM is not proposing to increase domestic livestock use in this area but to spread present use over a larger area. The total AUMs expected available for livestock use by 2006 are 150. Although the 265-AUM production estimate for this allotment is very conservative, it should be noted that this does not include state alfalfa fields or private pasture in this area. The use of domestic livestock as a tool in the management of game ranges is not a new concept. The ES cites studies indicating that livestock grazing improves elk habitat (Anderson and Scherzinger 1975) and ". . . creates a favorable balance between shrub and grasses" (Einarsen 1948). Tueller and Monroe (no date), studying game ranges in Nevada, concluded that "It would be irresponsible to recommend complete cessation of livestock grazing on these ranges, . . . because a certain amount of use by cattle and horses encourages browse reproduction by reducing competing grasses and forbs." Thus, it appears to be good management at this time for the BLM to propose domestic livestock use in the Billy Creek portion of the Billy Creek AMP. The reintroduction of domestic livestock into the Billy Creek portion of the allotment will only be accomplished after full consultation with DOW personnel.

18. Commenters Numbers 7, 11, 12, 20 and 26

Comment: DOW field personnel are not convinced that the statement ". . . that elk will not use an area where cattle are present or where they have been . . ." (page 2-61, DES) is valid for Colorado where the two species share the same ranges.

Response: All discussion of the cattle-elk conflict on pages 2-61 and 3-60 (DES) has been deleted from the FES, since all responses from Colorado support your views.

19. Commenter Number 20

Comment: The last paragraph, left side of page 3-58 and continuing on right side of page, should be rewritten to clarify meaning.

Response: The paragraph described above has been rewritten for the FES (chapter 3, Wildlife, Terrestrial, the last paragraph under General Impacts).

20. Commenter Number 20

Comment: With regard to 2-65 (DES), although river otter are on the state list of endangered species, they are not yet on the federal list.

Essential nesting and hunting habitats for the peregrine falcon have been identified in two portions of the resource area by the Division of Wildlife. These include the lower Black Canyon and eastern Ouray County. The latter area has had an active nest for several years.

Response: The FES text has been revised to reflect your comments (chapter 2, Wildlife, Terrestrial, paragraphs 1 and 2 under Endangered Species).

Aquatic and Riparian

1. Commenter Number 7

Comment: With respect to proposed pinyon-juniper chainings, it is stated that chemical elements most likely to be yielded by erosion brought on by a "significant runoff event" would be phosphorus and potassium. The results of this phosphorus loading of area streams are not dealt with adequately. Phosphorus is often a limiting factor in algal growth. A potential algal bloom resulting from chemical loading should be discussed.

Response: Increased phosphorus would occur only during a significant runoff event. Runoff during significant storm events in this area causes high velocities and turbidities. These conditions are not conducive to algal blooms. Area streams are generally low in nutrients, and a short-term increase in phosphorus would not negatively affect the aquatic ecosystem.

2. Commenter Number 22

Comment: From statements made on page 3-16 (DES), it appears that an inadequate water quality data base exists in the study area. Apparently, grazing should not significantly degrade water quality, but a few deficiencies should be corrected. There is a major inconsistency between chapter 3 and chapter 5 of the DES. Chapter 5 predicts lower water quality and negative impacts for trout fisheries due to sediment from runoff from BLM lands. Chapter 3 states that the same segments will improve as a result of the proposed action. This inconsistency should be cleared up and measures proposed to prevent degradation of water quality and riparian habitats.

Response: The second paragraph in chapter 5 under aquatic and riparian has been removed in the FES since it was in error: the water quality will definitely be improved by the proposal.

3. Commenter Number 1

Comment: On pages 8-32 and 8-33 (DES), have studies really been made to determine the extent of the riparian habitat deterioration, and if so was it determined that it was all due to livestock grazing? Have you data to show the extent that stream banks cave in or off because of livestock, as implied in chapters 8 and 3?

Response: No long-range studies have been made to determine the extent of riparian habitat deterioration.

4. Commenter Number 1

Comment: On page 3-74 (DES), it is implied that cattle feces in the streams would reduce fish population. On the contrary it would fertilize the stream and provide more food for fish.

Response: The reference to cattle feces has been removed from the text for the FES (chapter 3, Recreation, paragraph 1 under Fishing).

5. Commenters Numbers 1, 11, 24, and 25

Comment: I disagree with the statement on page 3-64 (DES): "Grazing these plants (riparian) in fall and winter after their food reserves are stored and during their dormant period can limit the ability of the plant to regrow the following spring." This is least harmful and can be conducive to more vigorous growth by a pruning effect. Certainly this is the period that plants can withstand greatest defoliation, even as high as 70 percent, without harm. Hormay (1970) does not confirm such a statement and neither does Cook (1971).

Response: The above quoted statement has been replaced with a direct quotation from Hormay (1970) in the FES (chapter 3, Wildlife, Aquatic and Riparian, paragraph 2). Many times riparian vegetation is used heavier than 70 percent.

6. Commenter Number 20

Comment: At the bottom of page 3-64 (DES) it is stated that "About the only way to preserve such values (riparian habitats) is to fence off the area from grazing." Why is fencing not included as a proposed improvement to protect riparian habitats?

Response: When a live stream is included in a pasture in a semi-arid region, cattle tend to congregate in the stream bottom area. Consequently, riparian communities are utilized to a greater extent than other pasture areas. The only sure method of protecting riparian zones is to eliminate grazing by fencing. In most cases, development of alternative water sources, adjusting stocking rates, or season of use may decrease the impact on riparian areas adequately. These steps are being taken in the ES area, since fencing is expensive and can create other environmental problems.

7. Commenter Number 20

Comment: Arguments and conclusions presented on pages 3-64 and 3-65 (DES) are contradictory. Published results of studies indicate rest rotation grazing systems do not help riparian habitats, yet the conclusion is drawn here that there will be a net overall improvement of 28.9 miles of stream riparian habitat as a result of the proposed action.

Response: The discussion of riparian vegetation beginning on page 3-64 (DES) indicates that rest rotation systems do not always improve these areas for fish and wildlife. It is stated that each case is unique and must be evaluated separately. In areas where riparian zones have been heavily utilized in the past, rest rotation is not predicted to improve the riparian areas. In such cases, fencing may be the only way to preserve these values. The AMPs propose a better distribution of grazing pressure, establishment of water sources away from streams, and a better control of livestock grazing and trailing in specific areas. These are the reasons for a predicted overall net improvement of certain specific riparian zones. Chapter 4, Monitoring Studies (page 4-6, DES), calls for further studies to determine areas where further protection of riparian habitats is needed.

8. Commenters Numbers 11, 24, and 25

Comment: On page 3-65 (DES), problems associated with riparian vegetation, stream bank instability, and sediment yield and water turbidity are directly attributed only to livestock grazing. Many riparian species of vegetation are of low palatability to livestock. Stream banks may be unstable and sediment yield and water turbidity will occur in the absence of livestock use.

Response: It was not the intent of this statement to imply that all resource problems are attributable to livestock. The text has been revised for the FES (chapter 3, Wildlife, Aquatic and Riparian, paragraph 1 under Aquatic Habitats).

9. Commenter Number 25

Comment: On page 6-3 (DES), the effects of livestock grazing on aquatic and riparian habitats were again overstated as per my statement regarding page 3-65 of the DES (comment 8 above).

Response: We believe the statement under Aquatic and Riparian on page 6-3 (DES) is an accurate one. Platts & Rountree (1972) and Hormay (1976) substantiate this statement.

10. Commenter Number 20

Comment: In the DES, under Alternative C, conversely to Alternative B, riparian habitats of the same wildlife species would be degraded.

Response: Wildlife populations are said to decrease under Alternative C of the DES. See page 8-61, Wildlife: Aquatic and Riparian.

11. Commenter Number 20

Comment: Since the endangered Colorado squawfish has been reported from the Gunnison River in Mesa County and its historical range extended well into Delta County, this species may yet occur in the resource area. Likewise the humpback and bonytail chubs historically occurred in the area. The humpback sucker is classified not as endangered, but as threatened by the Colorado Wildlife Commission.

Response: The BLM will continue to work with the Division of Wildlife on the identification of suitable habitat for these two species. There is no evidence to indicate that the proposed grazing management program would have any adverse impact on these species.

12. Commenter Number 1

Comment: On page 5-3 (DES), under Aquatic and Riparian, it would seem that wildlife eat as much or more riparian vegetation than cattle, so why is all the blame placed upon cattle?

Response: The text has been revised for the FES (chapter 5, Wildlife, paragraph 1 of Aquatic and Riparian).

13. Commenter Number 20

Comment: No mention is made of the increase in terrestrial wildlife that would occur in riparian areas under Alternative B. Grouse, wild turkey, chukar partridge, quail, and rabbits, as well as furbearers like beaver and muskrat, would increase in number with improved riparian habitats.

Response: A paragraph has been added to the FES (chapter 8, Alternative B, Wildlife: Aquatic and Riparian, final paragraph).

14. Commenter Number 25

Comment: How can 11.4 miles of riparian habitat "remain nonexistent due to lack of water"? This should be changed.

Response: The text has been changed in the FES (chapter 8, Alternative B, Wildlife: Aquatic and Riparian, paragraph 1).

Cultural Resources

1. Commenter Number 13

Comment: All sites on table A-13 (page A-44, DES) are listed as either of "Local," "State and Local," or "National, State, and Local" significance. Does this mean that the sites are significant by the agency's criteria, or are they eligible for the National Register of Historic Places by the criteria set forth in 36 CFR 800.10? What is "significant"? You should specify what criteria you have established to determine significance. A category showing eligibility or noneligibility for the National Register of Historic Places would be appropriate for table A-13.

Response: It is the Montrose District's judgment that all archeological values have significance and therefore deserve protection. The level of significance varies according to the particular resource under consideration. Those sites assigned state and local significance values are considered to contain information that would enhance understanding of local cultures. Those sites with national significance are considered to be eligible for the National Register; they are discussed in chapter 2 (FES), Cultural Resources, paragraph 8 of Archeological Resources.

2. Commenter Number 13

Comment: The National Register of Historic Places and pending nominations to the National Register were checked to determine the status of

the five archeological sites listed on page 2-73 (DES). None of the sites had been nominated or was pending nomination, at that time. It was established, through personal communication, that the necessary procedure for nominating these sites to the National Register had been delayed and clarification of this issue is in process.

Response: The nomination of these five sites to the National Register was delayed because additional information needs to be gathered.

3. Commenter Number 19

Comment: It is our understanding that compliance with the environmental impact requirements of Section 102(2)(c) of the National Environmental Policy Act and regulations thereunder should include compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and Executive Order 11593. This ES is incomplete in that it does not contain evidence of compliance nor does it contain provisions to ensure future compliance.

Response: Chapter 4 states that compliance under Section 106 of the National Historic Preservation Act of 1966 will be accomplished prior to the implementation of any projects (page 4-3, DES).

4. Commenter Number 19

Comment: We note that under Cultural Resources in chapter 2 (DES) the BLM has identified four National Register properties and three other properties that possess architectural and historical value within the impact area of the undertaking. Since these properties are within the impact area of the undertaking, the BLM should consider the effect of the undertaking upon them, as required by Section 106 of the National Historic Preservation Act of 1966, as amended. To do this, the BLM should consult with the State Historic Preservation Officer to evaluate the eligibility of the properties identified and the effect that this undertaking will have upon all properties included in or eligible for inclusion in the National Register. If eligible properties will be adversely affected by the project, the BLM should obtain the comments of the advisory Council on Historic Preservaton in accordance with the procedures set forth in 36 CFR Part 800.

Response: The four historic sites identified as National Register properties would not be affected by the proposed action. The three other historic sites, one of which is on private lands, have no BLM grazing systems or BLM projects on them, and therefore they would not be affected by the proposed action. The sections on Historic Resources have been rewritten in chapters 2, 3, and 4 of the FES.

5. Commenter Number 6

Comment: Recreation does not seem to be taken very seriously. How can any damage to cultural sites be negligible; are you serious about measures for mitigation?

Response: See chapter 4, Mitigating Measures, for details of how the cultural resource will be protected (page 4-3, DES).

6. Commenter Number 1

Comment: On page 5-3 (DES), why does cattle grazing destroy archeological areas?

Response: Cattle grazing is not mentioned in chapter 5 in relation to adverse impacts. Chapter 3, page 73 (DES), discusses the effects of cattle grazing.

Range Improvements

1. Commenter Number 7

Comment: The proposed action does not state what will be done with the by-products of numerous chaining projects. Will the collected brush be left as possible animal habitat, will it be removed from the area, or will it be burned causing reduction in air quality?

Response: The following statement has been added to the FES: "The chained brush would be left in place and not windrowed. In most cases, the pinyon pine would be sold for firewood" (chapter 1, Proposed Improvements, paragraph 2 under Chaining and Reseeding).

2. Commenter Number 25

Comment: Item 4 on page 1-24 (DES) should include a statement saying that disturbed areas to be revegetated would be protected until reestablished.

Response: The addition has been made to the FES (chapter 1, Proposed Improvements, item 4 under General Design Features). It is currently BLM policy to protect all seeded areas.

3. Commenter Number 20

Comment: In the DES, fencing specifications described on page 1-29 and illustrated on page 1-30 meet some but not all Division of Wildlife (DOW) fencing specifications. Specifications under item 7 and in figure 1-2 should be modified

to reduce overall height to 42 inches while maintaining the same 16-inch and 12-inch spacing of the bottom and top two wires, respectively. Deer mortality from added fences (page 3-60, DES) could be minimized by following these specifications.

Response: Specifications have been changed for the FES (chapter 1, Proposed Improvements, in the second item 7 under Fences and on figure 1-3). However, some mortality may still occur.

4. Commenters Numbers 11, 14, and 25

Comment: I question whether waterbars can be designed and constructed to stop all vehicular traffic.

Response: Waterbars may be a misstatement, but BLM has constructed effective dirt barriers. Of course they have been subject to vandalism, just as posts, chains, etc., have.

Other

1. Commenter Number 1

Comment: Chapter 3 of the DES, with few exceptions, has many somewhat biased statements. The bias is that livestock grazing is detrimental. Soil compaction, increased runoff, increased erosion, increased competition with big game and even nongame species, and riparian habitat destruction are the arguments against grazing in chapter 3. In addition, chapter 8 and chapter 3 contradict themselves in many respects. Chapter 8 states that grazing by livestock can sometimes be beneficial, but chapter 3 points out all of the adverse effects of livestock grazing without qualification.

Response: On the contrary, chapter 3 (DES) does discuss both beneficial and adverse impacts. Table 3-17 (page 3-88, DES) summarizes the impacts of the proposal and shows the improvement that would be obtained by a sound grazing management program. It should be remembered that livestock grazing can be detrimental unless properly managed. The proposed livestock grazing program would be properly managed and adverse impacts would be minimized.

2. Commenter Number 26

Comment: Grazing Treatments A and E, if applied with the consent and agreement of the operators, will work, but I question the dates used for winter grazing: 11/11 to 2/15 on table 1-7, page 1-20 (DES). No growth starts before 4/1, so I don't see why winter grazing isn't from 11/17 through 4/1.

Response: All dates in the discussion of grazing treatments are average dates, as indicated on page 1-18 (DES). These average dates pertain only to the proposed action and are not general statements on dates of grazing treatments elsewhere. Thus, the ending date for Treatment D is also an average date for this proposed action. Some years green-up for some grasses and forbs may occur as early as March 1 in this area, so that March grazing would be spring grazing.

3. Commenter Number 7

Comment: The Dominguez Creek area has a strong potential for eventual wilderness designation under the Roadless Area Review and Evaluation. The proposed action of the DES provides for developments that are totally inconsistent with wilderness designation. Developments that are inconsistent with potential wilderness designation should not be made before the decision concerning the designation has been made: they could have adverse effects on the outcome of the wilderness designation by biasing the decision towards the already developed planning framework.

Response: As pointed out under Recreation, on page 3-76 (DES), no improvements would be made on the Dominguez allotment (4001) until it has been determined whether it qualifies for wilderness designation. If it does qualify, the AMP would have to be redone.

4. Commenters Numbers 1 and 25

Comment: According to the ES (page 8-33, DES), if all grazing was eliminated, only about 2.3 percent of the total cattle numbers of the area would be lost and only 11 operators out of 146 would perhaps go out of business. I believe this is an unreasonable simplification of the impacts upon the livestock industry of the Uncompahgre area.

Response: The eleven operators referred to on page 8-33 (DES) are those who would be most likely to go out of business because they have over 25 percent dependency on NRL. The discussion goes on to point out other factors (e.g., season of use) which might also cause other operators to go out of business or to be otherwise adversely affected by elimination of grazing. However, as noted in the discussion, there is not sufficient information available to predict specific impacts or specific numbers of operators who might go out of business.

5. Commenters Numbers 11, 24, and 25

Comment: Comments on pages 2-101 and 2-102 (DES) label local people as conservative in their socio-political attitudes, to the extent that they would be detrimental to the well-being and progress of their communities as well as having a detrimental attitude towards federal lands. This implication is erroneous and a misuse of the term "conservative." This conservatism exists in the rural areas as it relates to the new liberal left movement of our nation, for example, as it affects government spending and liberal morals movement.

Response: The socio-cultural attitudes section to which this comment refers is basically a summary of attitudes of area residents in general and of livestock operators in particular as revealed at a number of BLM planning meetings. Use of the term "'conservative" is merely an effort to describe the generally prevailing socio-cultural environment of the ES area: it does not imply nor is it intended to carry a negative judgment or inclination. On page 2-102 (DES), it is explicitly pointed out that most livestock operators support the multiple-use management philosophy, have strong, well-founded beliefs in the importance of their profession, favor range improvements that facilitate livestock grazing, and acknowledge the importance of good conservation practices. The individualistic nature of livestock operators is also indicated. This also is simply an exposition of the record as indicated at BLM planning meetings and is not intended to carry with it a negative connotation.

6. Commenter Number 20

Comment: On page 2-118 (DES), the impacts of the Dallas Creek project and the Dominguez Dam project on wildlife and recreation are mentioned under Wildlife and Recreation, yet no mention is made there of the impacts of the Fruitland Mesa project. However, the existence of this project is subsequently acknowledged under Agriculture on the same page.

Response: All mention of the Fruitland Mesa project has been deleted from the FES, since this project has been dropped by the administration.

7. Commenter Number 25

Comment: On page 3-77 (DES), it is stated that later turnout dates and no spring grazing would "shorten the growing season." I think the intent was to "shorten the grazing season."

Response: The DES text is correct. It indicates that livestock would be grazing on private lands later into the spring; consequently, the recovery period ("the growing season") when the livestock would be off that land would be shortened.

8. Commenter Number 6

Comment: I could find no proposal for a funded monitoring system to measure the effects of the plan on the range for cattle, sheep, and wildlife.

Response: See chapter 4, Monitoring Programs, page 4-4 (DES).

9. Commenter Number 25

Comment: The reason for elimination of grazing on page 1-21 (DES) should have been explained.

Response: There is no further explanation for the elimination of grazing than that offered on page 1-21 (DES).

10. Commenter Number 10

Comment: The ES does not analyze the bases for, or propriety of, the proposed designations of particular allotments as suitable for either custodial or intensive management.

Response: The appropriateness of custodial management was determined through the BLM planning process, which included careful scrutiny of each allotment by resource specialists and public participation. Custodial management was selected for those allotments with limited resource values, where the range trend was stable and the public land acreage was small in comparison with the total area grazed. A few allotments were proposed for custodial management when it was found that the improvements needed to develop an AMP were not economically feasible and that no resource damage would occur with this management. The text has been changed to reflect the above comment (FES, chapter 1, Components, first paragraph under Custodial Management of Grazing).

11. Commenter Number 10

Comment: The ES must contain a rigorous assessment of the capacity of each proposed grazing area to support grazing at any level. This draft never analyzes the capacity of any proposed grazing area, given its resources and their current conditions, to support the proposed levels and intensities of livestock use.

Response: A detailed site-specific analysis was made of each allotment considering the following factors: a. Carrying Capacity. The current grazing

capacity for livestock and wildlife was estimated by an ocular reconnaissance survey of 72 percent of the area. The other 28 percent was estimated from a comparison of current livestock and wildlife use on sites with similar range condition and trend as those surveyed. Range management is not an exact science. All accepted methods of forage inventory provide estimated carrying capacities on ranges of this type and provide a stocking rate as a starting point for management. Department of Interior decisions of law have generally upheld the BLM's grazing capacity estimates. Two examples are as follows:

Howard Lathrop, A-23242, March 21, 1942: "While it is admitted that ratings of carrying capacities cannot be made with absolute accuracy, it is nevertheless necessary that the Department accept the ratings made by the grazing service unless it has been clearly shown that they are incorrect."

C. A. George, Vera Bowen, A-27488, November 7, 1957: "In the absence of persuasive evidence that the conclusions are incorrect, the estimates of grazing capacity made in accordance with standard Bureau practices are to be used in determining the grazing capacity of public lands."

Based on current estimates, a reduction in use of 2,052 AUMs per year is recommended for the planning period, or next 28 years. This information is displayed by allotment in table 1-4 (page 1-10, DES) which shows acreage, grazing capacity estimate by class of livestock, season of use, grazing system, and number of pastures.

b. Climate. An extensive study of the climate in the ES area was made and is summarized under climate in chapter 2 (page 2-3, DES).

c. Soils. Soil association information was obtained from the Soil Conservation Service and is summarized on map 2-2 (page 2-8, DES); table 2-2 (page 2-9, DES) shows acreages in each association by allotment. Descriptions of soils are also provided in chapter 2 under soils (page 2-4, DES). Table 2-11 (page 2-36, DES) shows the vegetative types by allotment with the present estimated grazing capacity and present vegetative density and key species composition. The potential production by vegetative type in each allotment is also given; it is based on information from the Soil Conservation Service using soil association information.

d. Erosion and Sediment. Present erosion conditions are given in table 2-4 (page 2-17, DES); this information comes from the BLM's Watershed Survey Phase I, which was conducted in 1972 and 1975. Future erosion conditions expected from the proposal are given in table 3-4 (page 3-7, DES). The estimated annual sediment yield by allotment is given in table 2-8 (page 2-26, DES) and was compiled using the Colorado Land Use Commission's Sediment Yield Map for Colorado (1974).

e. Range Condition. Range condition and trend by vegetative type in each allotment are shown in table 2-10 (page 2-30, DES). This information was compiled from the Phase I watershed study information gathered in 1975, and the trend was estimated by current trend studies and apparent trend information in the AMPs written in 1975 and 1976. Future range conditions by allotment and vegetative type are presented in table 3-9 (page 3-39, DES). These predicted range conditions were estimated using studies that have been made in the ES area and comparative studies made in other areas under similar conditions.

f. Browse Condition. Present browse conditions are given in tables 2-13, 2-14, 2-15, and 2-16 (pages 2-49 through 2-53, DES). These browse conditions were estimated from studies made in 1975 and were coordinated with the Colorado Division of Wildlife. The predicted future browse conditions in the deer crucial areas plus noncrucial areas are given in tables 3-11, 3-12, and 3-13 (pages 3-53 through 3-57, DES). Condition criteria are based on BLM Manual 6600.24.

g. Vegetation. Table 2-11 (page 2-36, DES) shows the present vegetative density and percentage by species composition by vegetative type in each allotment. Estimated future vegetative production, density, and composition of key species are given in table 3-8 (page 3-24, DES). Predicted vegetative density and key species composition estimates were made by professional range specialists using current studies and studies conducted on similar ranges by others using the best information and professional judgment available.

h. Riparian Habitat. Table 2-39 (page 2-119, DES) predicts future riparian habitat conditions without the proposed action by stream and allotment. Table 3-14 (page 3-66, DES) predicts future conditions under the proposed action by stream and allotment. We found very little research information available on riparian vegetation and in consulting with several experts in the field found that there are differences of opinion. The ES

team took the "worst case" approach in evaluating impacts. The monitoring program outlined in chapter 4 (page 4-6) will furnish the local data needed for management of this important resource. The statement, "These studies will be used to modify AMPs as more information becomes available," was intended to mean that mitigation would be accomplished when information is available to determine what is needed.

The draft ES used information from the aforementioned tables, which aggregate information by allotment, to assess the impacts. These impacts are discussed in chapter 3, using appropriate tables. Finally, the impacts are summarized in table 3-17, entitled "Projected Results of Proposed Action After Twenty Years in Comparison with the Present Status of the ES Area" (pages 3-88 and 3-89, DES). Table 8-29 at the end of chapter 8 (pages 8-102 and 8-103, DES) then summarizes impacts, including the alternatives.

12. Commenter Number 10

Comment: The statement, to be adequate, must analyze alternate levels of livestock use which are substantially different from those which exist or are proposed.

Response: Many studies (Cook 1971; Douglas 1915; Hormay 1970; Johnson 1965; Keng and Merrill 1960; Martin 1973; Ratliff, Reppert, and McConnen 1972; Stoddard and Smith 1955; U.S. Department of Agriculture, n.d.) have shown that proper use of the range through good range management practices and control of livestock is beneficial to rangelands and that rangeland may be improved and maintained in good to excellent condition through such use. This is what the proposal is designed to do along with the proper consideration of other uses. Alternative B, Elimination of Grazing, is the other extreme and shows what would happen if livestock grazing were completely eliminated. Two other alternatives analyze reductions in livestock use from the proposal. These two alternatives are offered to show what effect a reduction in livestock grazing would have on wildlife crucial areas and on lands with erosion problems. BLM believes this array of alternatives is a sufficient base for judging the feasibility and environmental consideration of grazing use in the Uncompahgre Basin.

13. Commenter Number 10

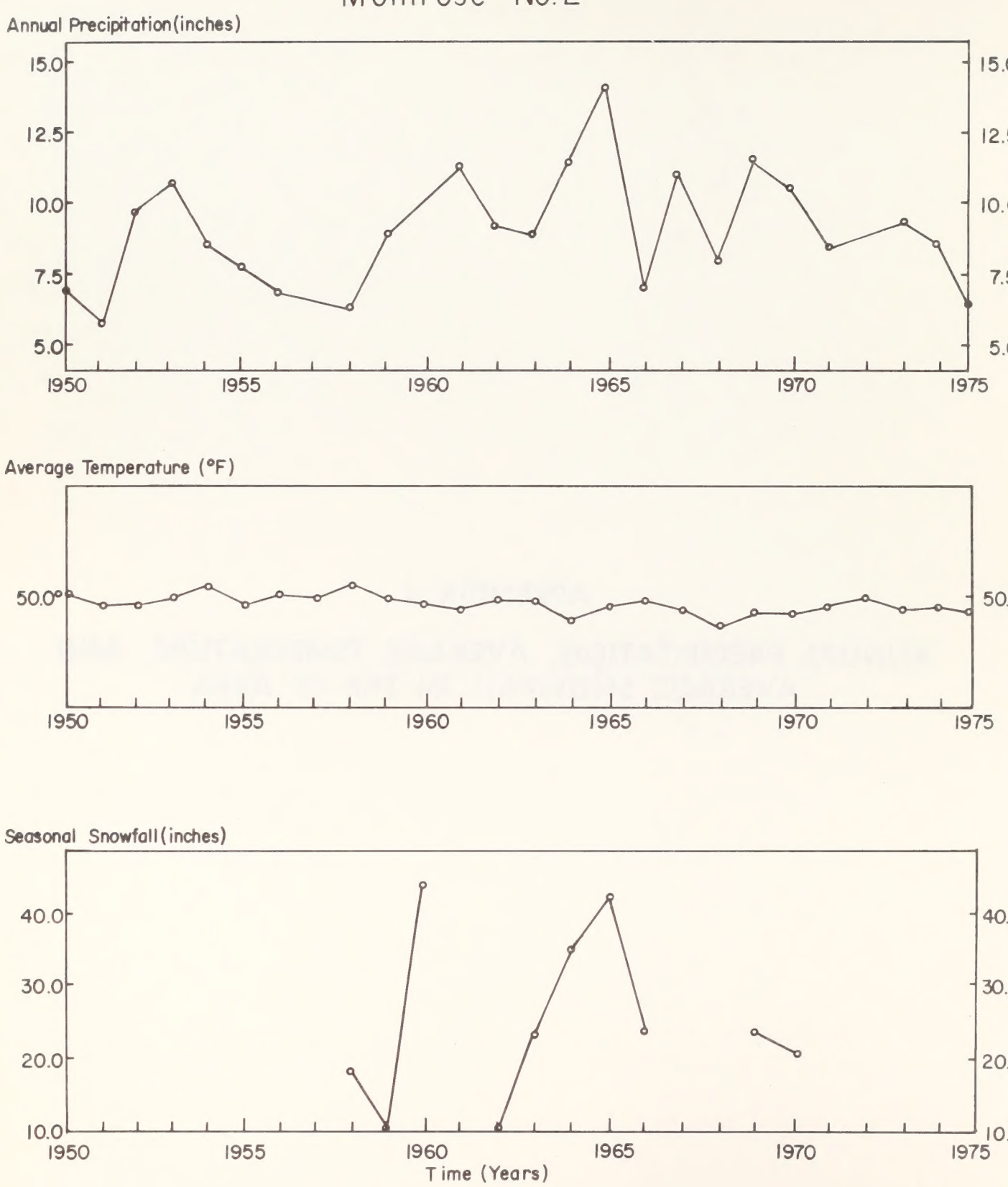
Comment: It is not enough merely to acknowledge that certain data are unavailable. The ES should analyze what effect, if any, the absence of that information had, or should have had, on the formulation of the proposed action. It should also indicate how and when those data will be obtained.

Response: There are several places in the document where it is stated that there are no data or that lack of data prevents absolute predictions of what will happen under the proposal. As mentioned before, since range management is not an exact science, the lack of this information does not preclude setting up a sound management program. Experience and professional judgment must be relied upon in starting any grazing program. The key to a successful grazing management program is the continued monitoring and evaluation of results being obtained. Chapter 4 outlines an intensive monitoring program and states that changes will be made in the grazing program as information gathered dictates.

APPENDICES

APPENDIX 1

ANNUAL PRECIPITATION, AVERAGE TEMPERATURE, AND AVERAGE SNOWFALL IN THE ES AREA



No data is available for years which were left blank.

Figure A-1. Precipitation, temperature, and snowfall data from Montrose No. 2 climatic station

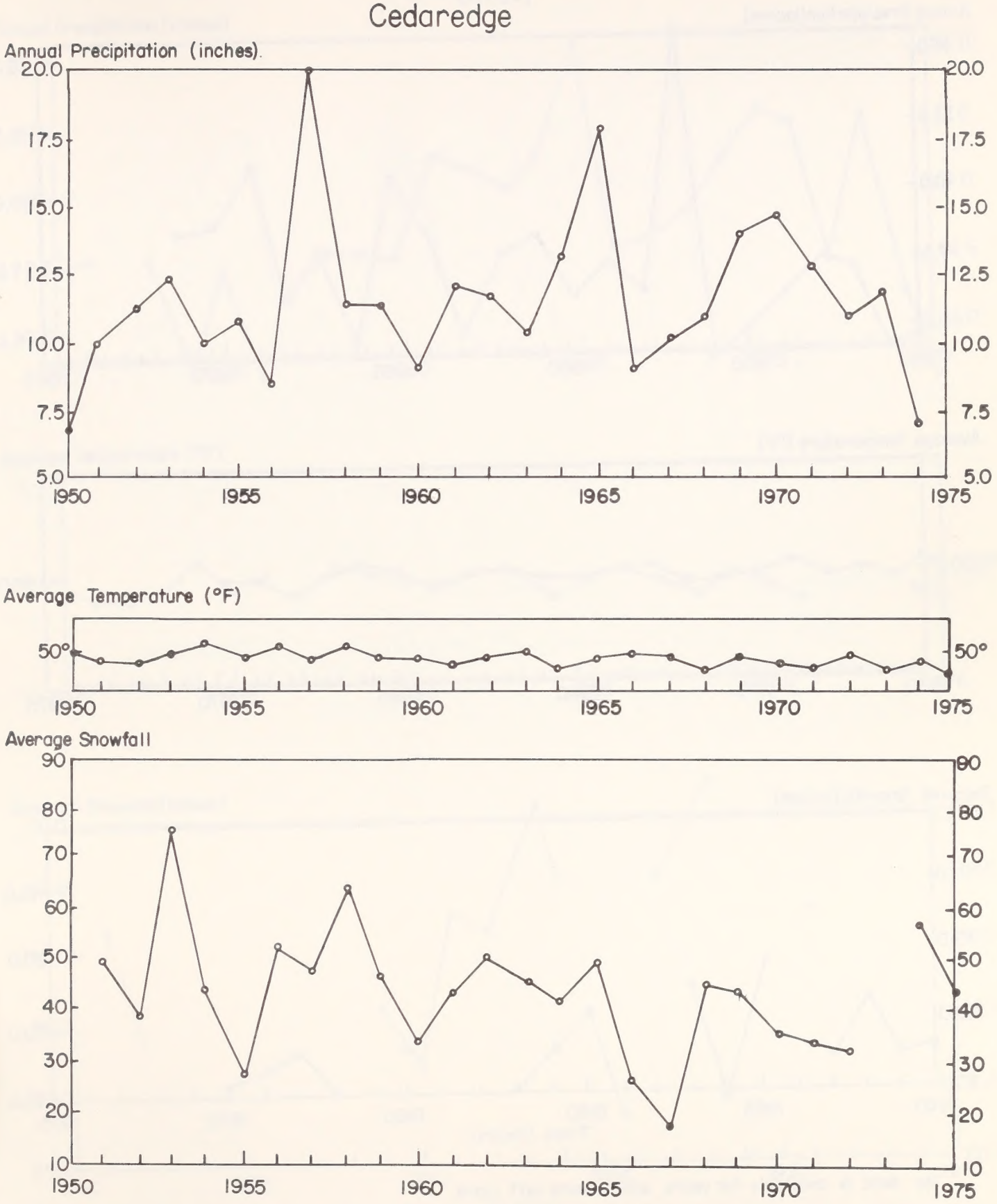
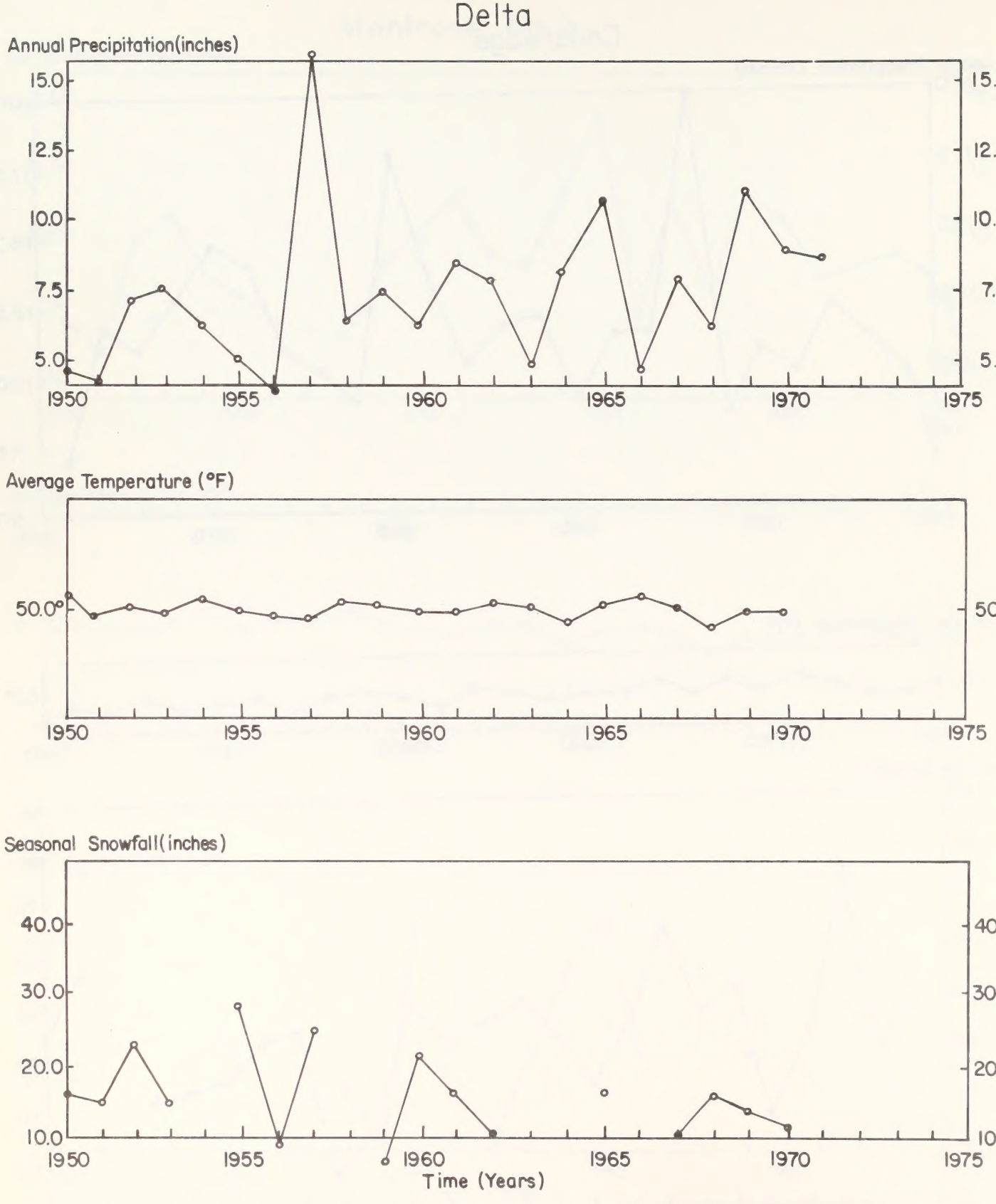


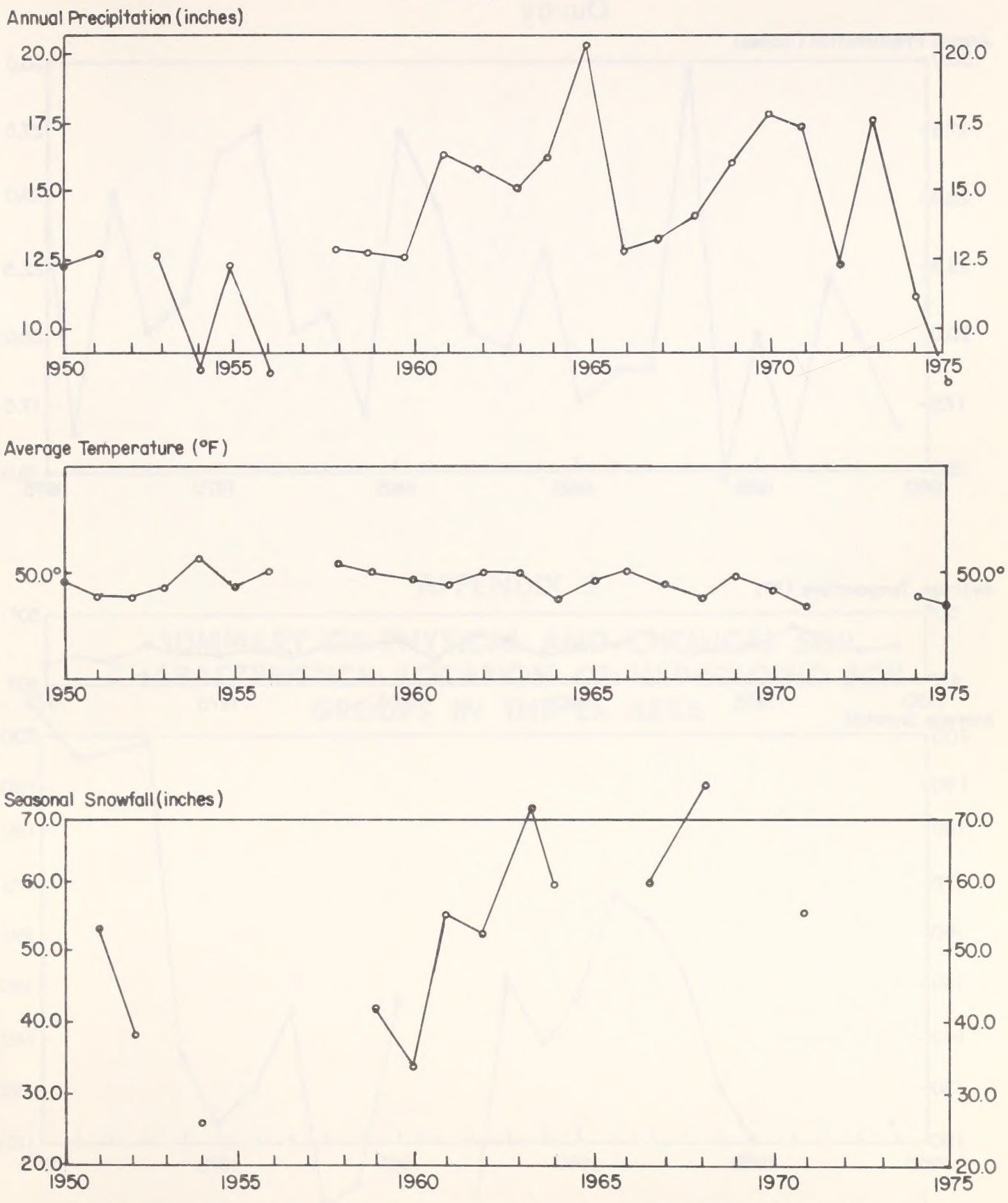
Figure A-2. Precipitation, temperature, and snowfall data from Cedaredge climatic station

No data is available for years which were left blank



No data is available for years which were left blank.

Figure A-3. Precipitation, temperature, and snowfall data from Delta climatic station



No data is available for years which were left blank

Figure A-4. Precipitation, temperature, and snowfall data from Paonia climatic station

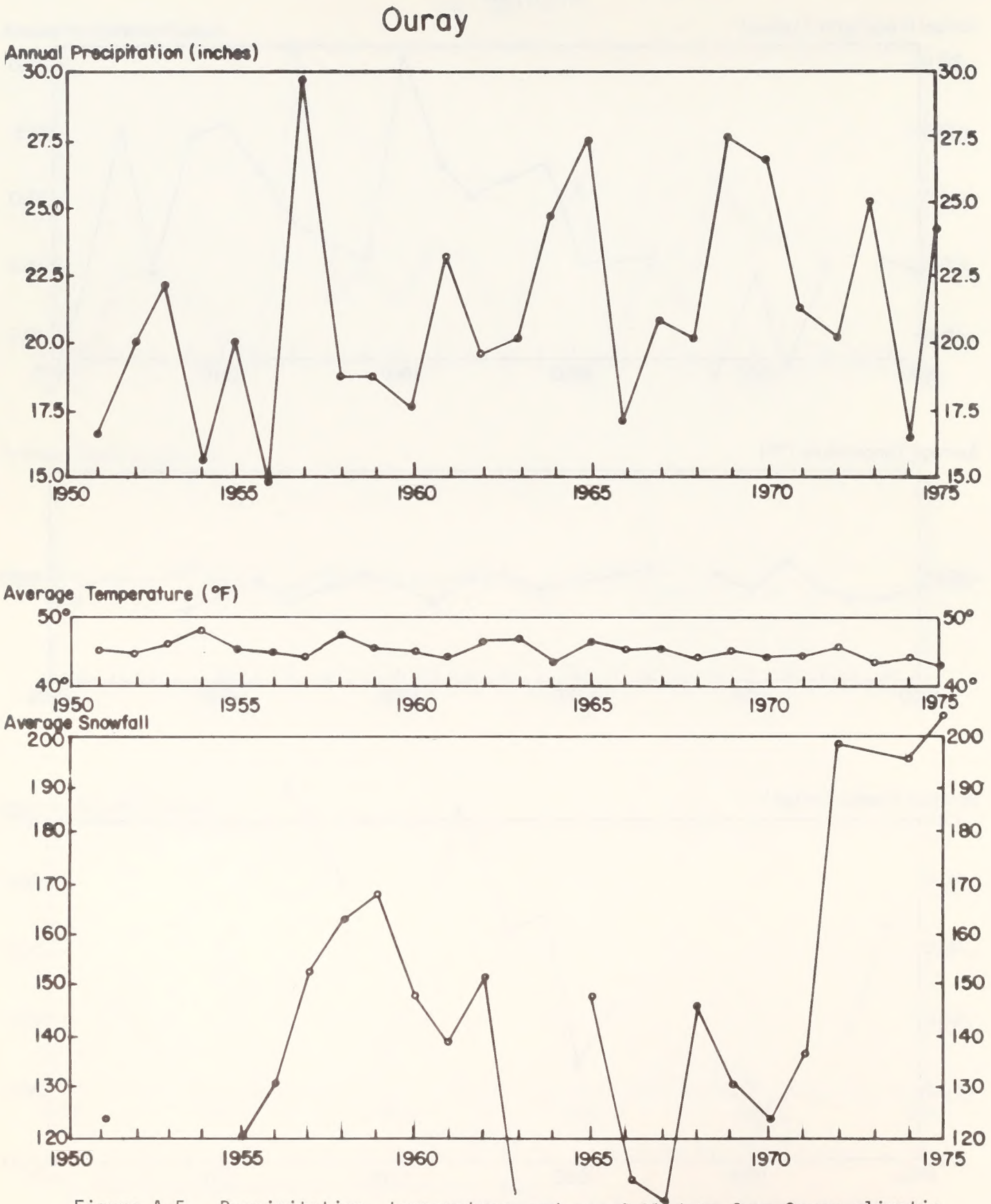


Figure A-5. Precipitation, temperature, and snowfall data from Ouray climatic station

No data is available for years which were left blank

APPENDIX 2

SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS; LOCATION OF HYDROLOGIC SOIL GROUPS IN THE ES AREA

TABLE A-1
SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS

Soils	Position on Landscape	Parent Materials	Drainage Class a/	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Perme-ability b/	Surface Runoff c/	Erosion Suscepti-bility d/	Vegetative Production Potential e/
Absarokee	Uplands and valley sideslopes (3 to 60% slopes)	Weathered sandstone and inter-bedded shale	Well drained	Loam to clay loam	30	Neutral to moder-ately alkaline	30	Moderately slow	Moderate	Moderate	2,000
Agua Frio	High terraces, mesas, and fans (1 to 50% slopes)	Cobbly and stony alluvium	Well drained	Fine sandy loam, to gravelly clay loam	60+	Moderately alkaline	60	Moderate to moder-ately slow			1,100
Avalon	Terraces, mesas, and valley foot-slopes (0 to 6% slopes)	Reworked basaltic alluvium	Well drained	Loam	60	Mildly alkaline to moderately alkaline	60	Moderate	Moderate	Moderate	700
Badlands*	This land type consists of barren or nearly barren outcrops of silty, calcareous shales mixed with small areas of deeper soil materials. The landscape is one of rolling uplands and very steep hillsides separated by narrow valleys or by gullies. Slopes range from 10 to 70%. The shales are in various stages of weathering. Badlands are nearly impermeable and surface runoff is rapid.										150

a/ Drainage class refers to the rate at which water is removed from a soil. Well drained means that water is removed from the soil readily, but not rapidly; well-drained soils have no standing water table.
b/ Permeability is that quality of the soil which enables it to transmit water or air. Soil permeability can be quantified in terms of a rate of flow of water through a cross section of saturated soil in a given time. Permeability rates are expressed in inches per hour. The classes are as follows: (1) "slow" equals 0.05 to 0.20 inch per hour; (2) "moderately slow" equals 0.20 to 0.80 inch per hour; (3) "moderate" equals 0.80 to 2.5 inches per hour; (4) "moderately rapid" equals 2.5 to 5 inches per hour; (5) "rapid" equals 5 to 10 inches per hour.
c/ Surface runoff refers to the relative rate at which water flows over the surface of the soil. (1) "Slow" means that surface water flows away so very slowly that free water covers the soil for a significant period or enters the soil rapidly. (2) "Moderate" means that surface water flows away at such a rate that a moderate portion of the water enters the soil and free water lies on the surface for only a short period of time. (3) "Rapid" means that a large portion of the precipitation moves rapidly over the surface of the soil and a small part moves through the soil.
d/ Erosion susceptibility is a rating based on expected losses of surface soil when all vegetative cover, including litter, is removed. The rating criteria are those used by the Soil Conservation Service, based upon soil slope and climate. (1) "Slight" means that little loss of soil material is expected; minor sheet or rill erosion may occur. (2) "Moderate" means that some loss of surface soil material can be expected; rills, small gullies, and sheet erosion may occur. (3) "Severe" means that considerable loss of surface soil material can be expected; rills, numerous small gullies, and sheet erosion can occur.
e/ Pounds of dry vegetation per acre in normal years based on assumed climax vegetation.
* Because these are land types rather than soils, they are described in narrative form.

TABLE A-1
SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (Cont.)

Soils	Position on Landscape	Parent Materials	Drainage Class a/	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Permeability b/	Surface Runoff c/	Erosion Susceptibility d/	Vegetative Production Potential e/
Beenon	Uplands and mt. slopes (5 to 60% slopes)	Weathered sandstone and interbedded shales	Well drained	Loam to clay loam	20	Neutral to mildly alkaline	20	Slow	Moderate	Moderate	1,000
Billings	Fans and flood plains (0 to 6% slopes)	Alluvium from silty calcareous shales	Well drained	Silty clay loam to clay loam	60	Moderately alkaline	60	Slow	Moderate to rapid	Moderate to severe	650
Bulkley	Mt. slopes and upland (12 to 65% slopes)	Fine textured alluvium	Well drained	Clay loam, clay to silty clay loam	60	Neutral to moderately alkaline	60	Slow	Rapid	Moderate to severe	2,200
Cerro	Alluvial fans, terraces, and mt. side slopes (1 to 35% slopes)	Landslide deposits and glacial outwash materials from igneous rocks	Well drained	Loam to clay loam (contains considerable gravels)	60+	Neutral to moderately alkaline	60	Moderately slow	Moderate	Moderate	2,000
Chipeta	Uplands (3 to 30% slopes)	Silty marine shales	Well drained	Silty clay	15	Mildly to moderately alkaline	15	Slow	Rapid	Severe	350
Cochetopa	Upland slopes and mesas (10 to 40% slopes)	Landslide deposits and alluvial sediment	Well drained	Loam to clay loam	60	Neutral	60	Moderately slow to slow	Moderate	Moderate	2,000
Delson	Fans and mesas	Stony alluvium	Well drained	Loam, clay, and clay loam (contains considerable basaltic cobble and stone)	60	Neutral to moderately alkaline	60	Moderately slow	Moderate	Moderate	2,000

TABLE A-1
SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (Cont.)

Soils	Position on Landscape	Parent Materials	Drainage Class a/	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Permeability b/	Surface Runoff c/	Erosion Susceptibility d/	Vegetative Production Potential e/
Fughes	Alluvial fans, valley sideslopes	Alluvium and landslide deposits	Well drained	Loam, clay loam, clay	60	Neutral to mildly alkaline	60	Slow	Moderate	Moderate	2,000
Gullied lands*	This land type occurs in and along small drainageways where runoff lies concentrated and cut into the soils. Deep gullies dominate this landscape.										0
Kech	Uplands (3 to 40% slopes)	Local sediment from sandstone and shale	Well drained	Loam to clay loam	20	Neutral to mildly alkaline	20	Moderate	Moderate	Moderate	1,100
Lazears	Uplands (3 to 30% slope)	Sandstone and shale	Well drained	Fine sandy loam to loam	15	Moderately alkaline	15	Moderately rapid	Moderate	Moderate	350
Mesa	Benches, high mesa, terraces	Cobbly alluvium	Well drained	Loam to clay loam (contains considerable gravels and cobbles)	60	Mildly to moderately alkaline	60	Moderately slow	Slow	Slight	200
Northwater	Mt. slopes, terraces, and outwash fans (5 to 25% slopes)	Cobbly alluvium	Well drained	Loam to clay loam (considerable gravel and cobble through profile)	60	Slightly acid to neutral	60	Moderate	Moderate	Moderate	3,000
Persayo	Uplands (12 to 25% slopes)	Weathered shale	Well drained	Silty clay loam	15	Moderately alkaline	15	Slow	Rapid	Moderate to severe	500

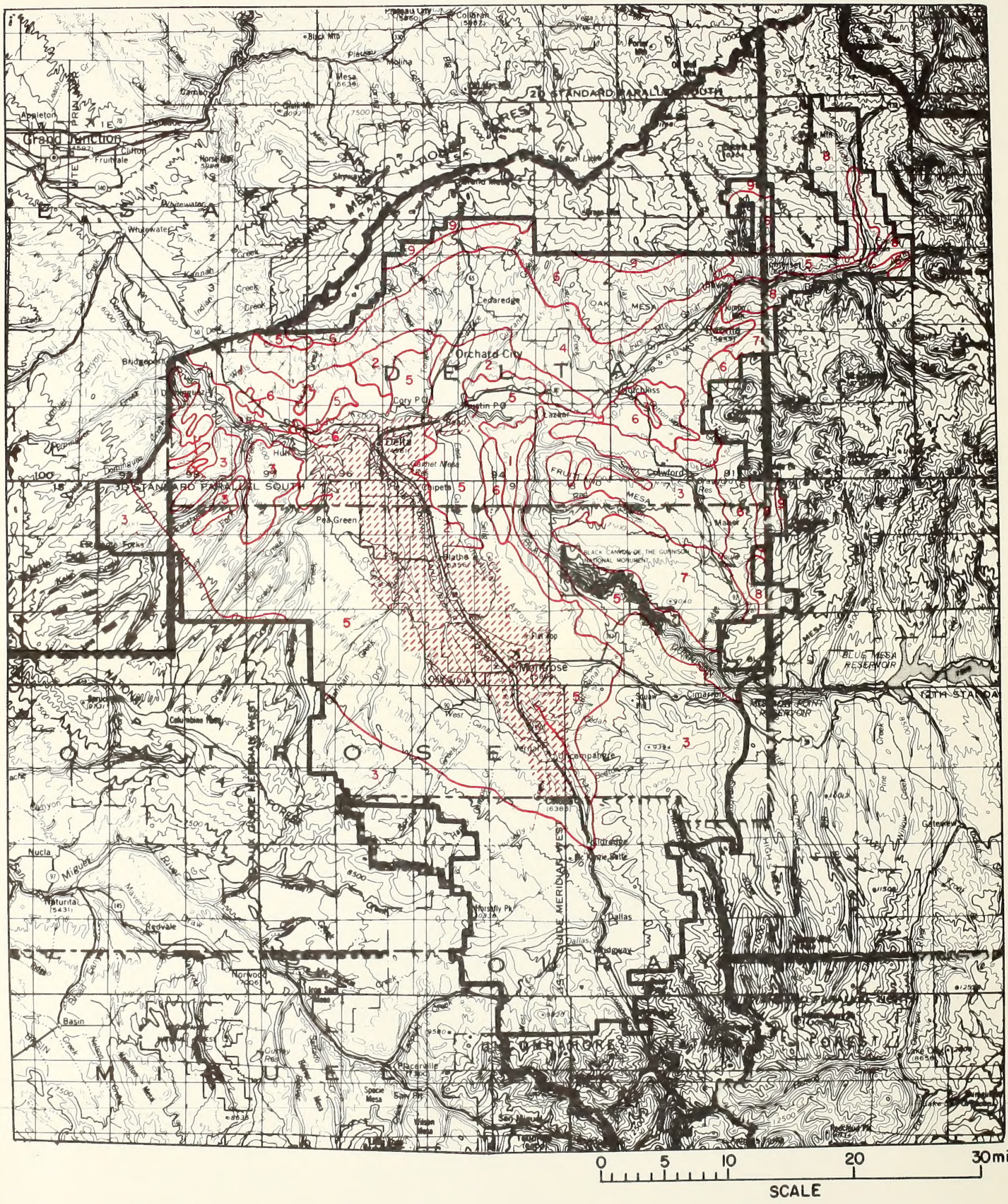
* Because these are land types rather than soils, they are described in narrative form.

TABLE A-1
SUMMARY OF PHYSICAL AND CHEMICAL SOIL CHARACTERISTICS (Cont.)

Soils	Position on Landscape	Parent Materials	Drainage Class a/	Texture	Depth (inches)	Soil Reaction	Effective Root Depth (inches)	Permeability b/	Surface Runoff c/	Erosion Susceptibility d/	Vegetative Production Potential e/
Progresso	Upland slopes and fans (1 to 15% slopes)	Local sediment from interbedded sandstone and shale	Well drained	Loam to clay loam	30	Neutral to moderately alkaline	30	Moderate to moderately slow	Moderate	Moderate	1,100
Rock outcrop*	This land type consists of exposed bedrock mixed with amounts of very shallow and stony soils over bedrock. Rock types include sandstones or interbedded sandstone and shales. Exposed bedrock generally exceeds 90% of the surface area. Slopes range from 20% to nearly vertical.										0-200
Sarton	Terraces, mesas, and sideslopes (3 to 5% slopes)	Stony calcareous alluvium from basalt	Well drained	Cobbly loam to gravelly loam	60	Moderately alkaline	60	Moderate to moderately slow	Slow	Slight to moderate	1,100
Shavano	Uplands (3 to 12% slopes)	Weathered sediments from sandstone and shale	Well drained	Fine sandy loam to loam	26	Moderately alkaline	26	Moderately rapid	Moderate	Moderate	700
Ustollic Haplargid soils**	These are moderately deep to deep, light colored, well drained soils that usually contain less than 35 percent fragments. These soils occur on gently sloping to steep valley sideslopes, dissected plateaus, and mesas. Slopes range from nearly level to 50% slope. Depth of bedrock ranges from 15 to 60 inches with the majority being less than 25 inches in depth.										2,000
Utaline	Mesas and high terraces	Alluvium derived from basalt bedrock	Well drained	Cobbly to very cobbly loam	60	Strongly alkaline	60	Moderate	Moderate	Slight because of cobbly surface	600

* Because these are land types rather than soils, they are described in narrative form.
** Because of the lack of detailed data, this soil is described by ranges of soil characteristics.

Map A-1. Hydrologic Soil Groups within the Environmental Statement Area



LEGEND

MAP UNIT	COMPOSITION BY HYDROLOGIC SOIL GROUP
1	70% Group B; 30% Group D
2	100% Group B
3	70% Group C; 30% Group D
4	67% Group C; 33% Group B
5	100% Group D
6	100% Group C
7	60% Group C; 40% Group D
8	85% Group C; 15% Group D
9	80% Group C; 20% Group B

PRIVATE LANDS

APPENDIX 3

WATER QUALITY SUMMARY FOR THE NORTH FORK OF THE GUNNISON RIVER BELOW HOTCHKISS; METHODOLOGY FOR HYDROLOGIC PREDICTIONS

TABLE A-2
WATER QUALITY SUMMARY: COLORADO STATE HEALTH DEPARTMENT STATION 100-5,
NORTH FORK OF THE GUNNISON RIVER BELOW HOTCHKISS

DATE FROM TO	TIME OF DAY	DEPTH FEET	WATER TEMP FAHN	PH SU	CONDUCTIVITY AT 25C MICROMHO	DO MG/L	BOD 5 DAY MG/L	TOT COL I MPN CONF /100ML	NH3-N TOTAL MG/L	NO2-N TOTAL MG/L
71/08/11	13	35	64.0	8.30	1297		0.9	240	0.080	0.006
71/09/15	16	45	60.0	8.20	1269			240	0.300	0.000
71/10/06	10	45	54.0	8.60	1343			2	0.040	0.005
71/11/04	11	50	37.0	8.60	1062		1.5	22	0.200	0.005
71/12/08	13	35	35.0	8.70	975			22		
72/01/19	12	05	32.0	8.60	960			240	0.080	0.006
72/03/07	14	35	50.0	8.20	820		5.5	220	0.370	0.034
72/04/19	11	20	50.0	8.50	700		2.0	22000	0.240	0.026
72/05/11	08	10	42.0	8.50	435			220		
72/06/06	09	55	56.0	9.00	350			220		
72/07/26	10	45	62.0	-	1300			220	0.040	0.046
72/08/24	07	10	52.0	8.30	1175			220		
72/10/12	11	10	56.0	8.20	1135		0.9	240	0.000	0.000
73/03/14	09	40	39.0	-	1188	10.0	3.2	2300	0.040	0.000
73/05/16	09	55	45.0	-	200	10.1	0.9	2200	0.080	0.000
73/08/15	10	35	60.0	8.50	1296	12.3	1.0		0.370	0.112
73/09/26	14	00	60.0	8.80	1070	10.0	2.0	220	0.160	0.061
74/04/01	15	45	44.0	-	484	9.6	2.0	240	0.080	0.000
74/08/08	15	30	68.0	8.30	1170	8.7	1.0	240	0.100	0.000
74/11/04	13	15	50.0	8.20	1221	11.2	2.0	96	0.000	0.007
75/01/13	09	35	41.0	8.10	1058	11.1	2.0	220	0.000	0.012
75/03/05	11	50	48.0	7.80	1033	9.8	2.0	38	0.000	0.003
75/05/08	11	20	48.0	7.90	575	9.9	3.0	2200	0.000	0.003
75/07/02	12	50	59.0	8.00	356	9.2	1.0	2200	0.040	0.010
75/09/09	11	00	59.0	-	1029	9.2	1.0	220	0.100	0.009
75/11/24	13	40	46.0	8.10	981	10.6	2.0	220	0.080	0.000
76/02/02	10	45	38.0	-	1120	13.8	2.0	930	0.600	0.005
76/04/12	10	25	41.0	7.70	330	11.3	3.0	430	0.100	0.000
76/06/15	09	50	50.0	8.10	670	9.9	1.0	2300	0.000	0.000

Source: Environmental Protection Agency STORET Retrieval.

TABLE A-2
WATER QUALITY SUMMARY: COLORADO STATE HEALTH DEPARTMENT STATION 100-5,
NORTH FORK OF THE GUNNISON RIVER BELOW HOTCHKISS (cont.)

DATE FROM TO	NO3-N TOTAL MG/L	CHLORIDE CL MG/L	SULFATE SO4-TOT MG/L	FLUORIDE F,TOTAL MG/L	BORON B,TOT UG/L	CALCIUM REPORTED AS CACO3 MG/L	MAGNESIUM MG,TOT MG/L	SODIUM NA,TOT MG/L	TOT HARD CACO3 MG/L
71/08/11	1.300	20	357	0.90	0	275.0	62.0	93.00	530
71/09/15	1.400	15	336	0.50	100	274.0	50.0	76.00	478
71/10/06	1.000	15	411	0.80	160	293.0	54.0	72.00	515
71/11/04	1.000	15	301	0.40	50			77.00	
71/12/08			270		100	224.0	42.0	94.00	397
72/01/19	1.300	11		0.60					
72/03/07	0.900		240		60	183.0	40.0	71.00	346
72/04/19	0.800	10		0.50					
72/05/11			130		120	129.0	19.0	23.00	208
72/06/06	0.300	3		0.30					
72/07/26	1.800		480		0	338.0	61.0	97.00	590
72/08/24		15		0.50					
72/10/12	1.000				160				
73/03/14	1.000	17	465	0.45	80	272.0	53.0	90.00	488
73/05/16	0.200	4						10.00	87
73/08/15	1.000	17	442	0.60	160	365.0	55.0	124.00	590
73/09/26	1.400	16						88.00	564
74/04/01	0.410	5	135	0.20	40	136.0	16.0	20.00	200
74/08/08	0.000	19	412	0.40	190	248.0	45.0	62.00	432
74/11/04	1.040	18	460	0.40	120	298.0	69.0	100.00	583
75/01/13	1.560	14	337	0.40	0	196.0	52.0	90.00	408
75/03/05	1.500	11	267	0.40	180	196.0	52.0	75.00	408
75/05/08	0.580	10	151	0.20	60	143.0	24.0	40.00	242
75/07/02	0.120	6	80	0.10	40	78.0	10.0	18.00	118
75/09/09	0.900	19	427	0.50	0	505.0	15.0	85.00	565
75/11/24	1.000	9	265	0.40	110	238.0	46.0	67.00	428
76/02/02	1.300	11	322	0.50	100	324.0	21.0	80.00	412
76/04/12	1.200	7	92	0.20	0	84.0	14.0	18.00	140
76/06/15	0.600	14	170	0.20	0	150.0	21.0	30.00	240

APPENDICES

METHODOLOGY FOR HYDROLOGIC PREDICTIONS

1. Nine representative watersheds were chosen on the basis of their geographic locations and vegetative, hydrologic soil, and climatic characteristics.

2. Each watershed was located on a 7.5 minute topographic map.

3. Vegetative, hydrologic soil group, and allotment overlays were made for each watershed.

4. Each hydrologic unit (i.e., vegetative type within a given soil type within a given pasture) was planimetered to determine the percent of the total area in the watershed. (A planimeter is an instrument that measures the area of a plane figure as a mechanically coupled pointer traverses the figure's perimeter.)

5. Each hydrologic unit was assigned a cover density using data collected during Phase I of The Bureau of Land Management's (BLM's) Watershed Conservation and Development System. Percent vegetative cover was added to the percent litter and half of the large rock plus small rock to get the cover density used in the Soil Conservation Service (SCS) model for predicting runoff.

6. Infiltration rates were assigned to each unit using the mid-point of the range of infiltration rates of the soil within the unit for pristine conditions, as shown in table A-3 (e.g., soil type D ranges from 0.08 to 0.42 inch per hour, and 0.25 inch per hour was taken as the mid-point), and adjusted from light intensity or no grazing to moderate grazing (figure A-6). If the adjustment showed an increase, the infiltration rate was assumed to remain at pristine conditions to start.

TABLE A-3.—*Maximum potential infiltration rates associated with various soil groups*

Soil group	Maximum potential infiltration rates[1]
A	3.50
A−	3.25
B+	2.71
B	2.13
B−	1.54
C+	1.13
C	0.88
C−	0.63
D+	0.42
D	0.25
D−	0.08

[1] Inches per hour.

7. A curve number was assigned to each unit using the equations in table A-4 where possible and table A-5 when the soil type within the unit did not coincide with the equations in table A-4.

8. A weighted curve number was then calculated for each watershed.

9. National Oceanic and Atmospheric Administration (NOAA) Atlas 2 (Miller, Frederick, and Tracey 1973) was used to determine design storm sizes for each representative watershed. Design storms chosen were 50 year-24 hour, 50 year-6 hour, and 5 year-2 hour.

10. The SCS Curve Number method (1972) was then used to determine runoff. (For purposes of predicting relative changes in flow Antecedent Moisture Condition II was assumed, i.e., 0.5 to 1.5 inches of rain in the previous five days.)

11. Peak discharge was determined for the 50 year-24 hour storm using a modified version of Kent's method (1968):

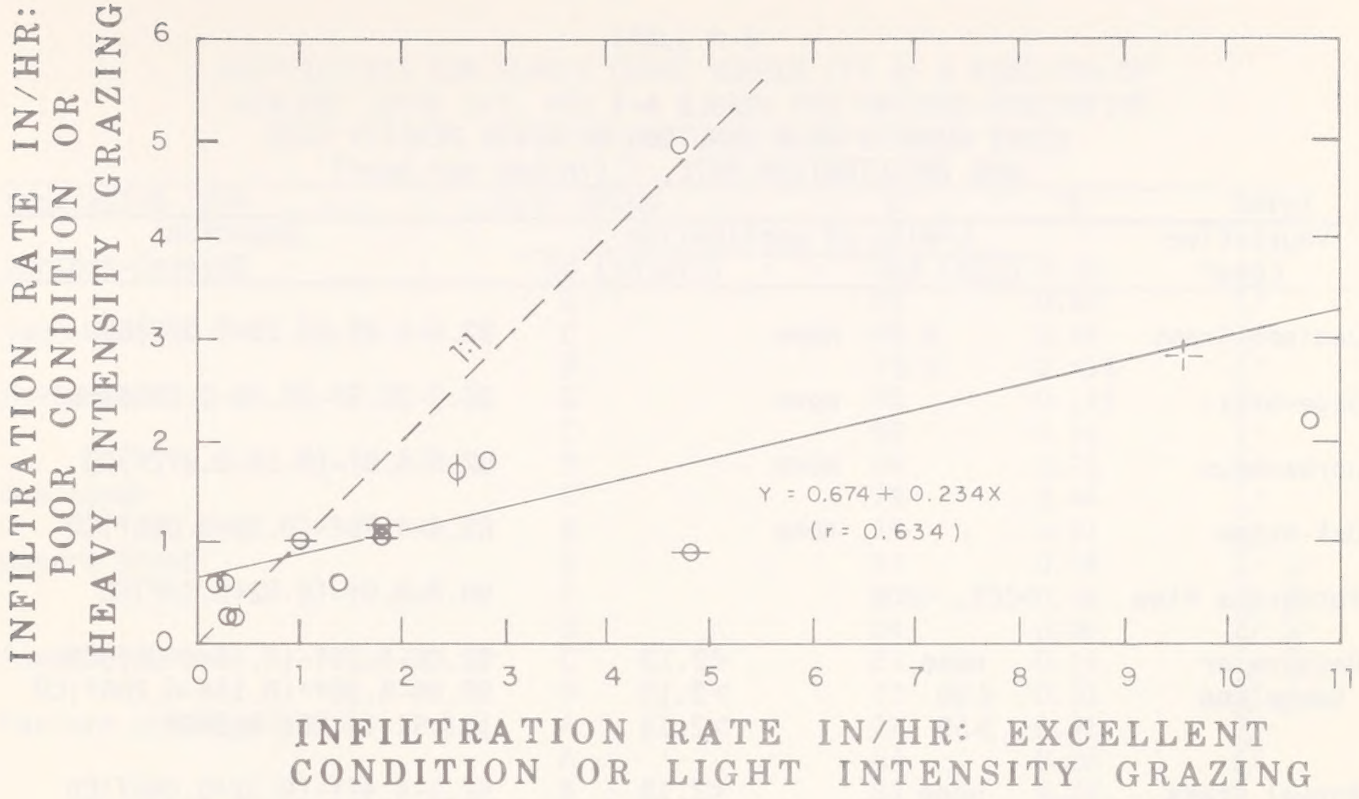
a. Slope estimates were made by placing a grid on the 7.5 minute topographic map of each watershed and measuring the distance between contours at the grid points.

b. The graphs presented in figure ES-1027 in Kent's publication were extended to 100,000 acres and 100,000 cubic feet per second (cfs) (see figure A-7).

c. The modified graphs were then used to make the peak discharge estimates.

12. Grazing within each pasture was plotted for the twenty years required to achieve full effects of the allotment management plans (AMPs). Periods of spring-summer and fall-winter grazing were recorded and the length of rest between grazing was also noted.

13. The infiltration rate at the end of the twenty year period was calculated for each unit by applying the regression equations presented in figure A-6. "Heavy" grazing, under a rotation scheme, was defined as all livestock being confined to a single pasture for any given length of time, and "moderate" grazing was defined as the livestock being spread over more than one pasture. All infiltration rates were fully affected under either heavy or moderate use regardless of length of grazing period (e.g., heavy grazing for two months equals heavy grazing for six months). "Recovery" between grazing periods was calculated assuming a linear four year recovery time to some speculative pre-grazing status, as defined by infiltration limits of respective hydrologic soil



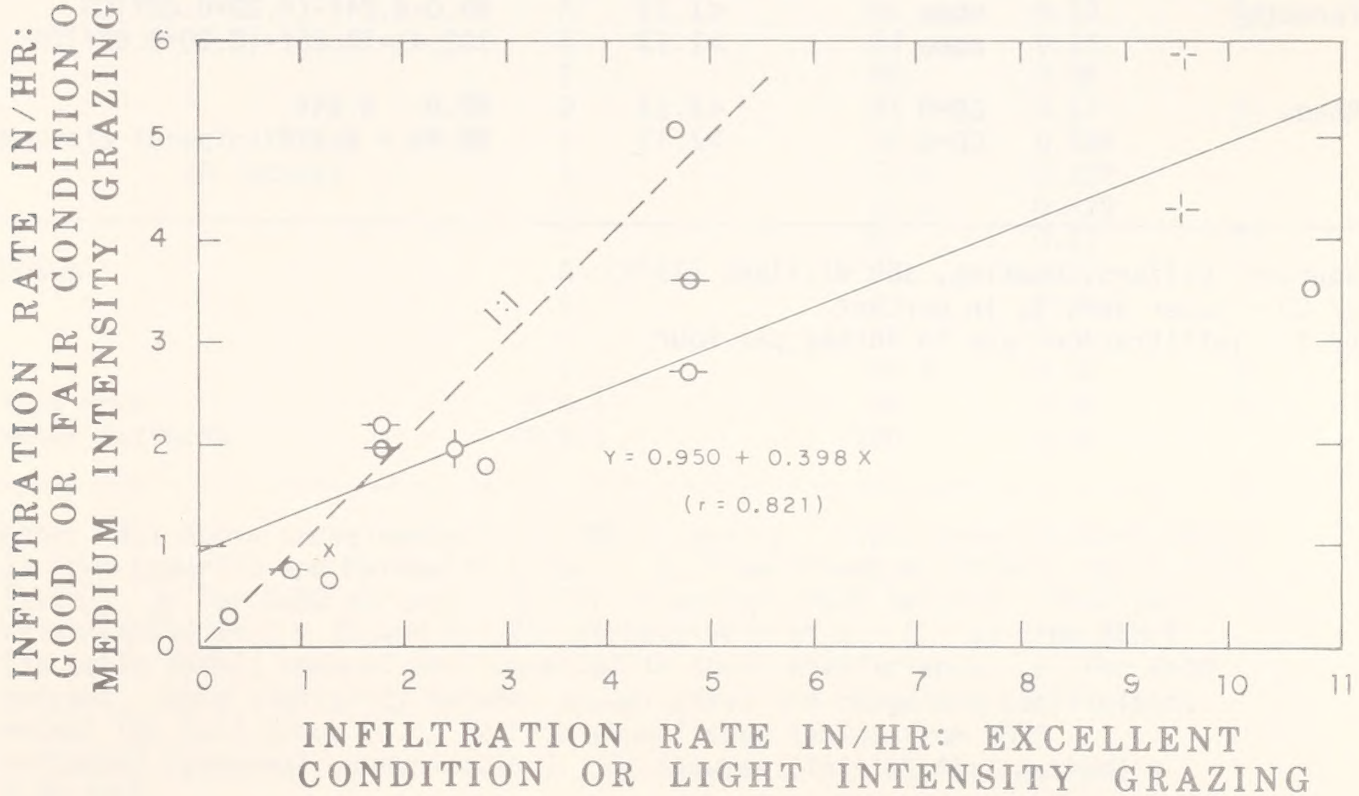


Figure A-6. Changes in infiltration rates when changing from light to moderate grazing intensities (Source: Gifford et al, 1975)

TABLE A-4
CURVE NUMBERS AS A FUNCTION OF COVER DENSITY (CD)
AND INFILTRATION RATE, f (inches per hour)

Vegetative Cover	Limits of application		Equation
	CD(%) a/	f(in/hr) b/	CN =
Juniper-Grass		none	92.4-4.8f-(0.25+0.08f)CD
Sage-Grass		none	96.0-10.5f-(0.49-0.035f)CD
Herbaceous		none	92.5-5.0f-(0.12-0.072f)CD
Oak-Aspen		none	83.4-4.25f-(0.39+0.055f)CD
Ponderosa Pine	>10%, <80%		90.0-8.0f-(0.02+0.13f)CD
Pasture or Rangeland	none	<2.13	92.06-4.26f-(0.11-0.08f)CD
	<50	>2.13	92.06-4.26f+(0.154-0.204f)CD
	>50	>2.13	113.91-14.55f-0.28CD
Annual Grass	none	<2.13	92.5-4.47f-(0.12+0.065f)CD
	<50	>2.13	95.37-5.82f+(0.019-131f)CD
	>50	>2.13	118.53-16.72f-(0.461-0.095f)CD
Forests	none	<1.13	89.0-8.24f-(0.20+0.02f)CD
	none	>1.13	102.41-14.55f-(0.20+0.02f)CD
Roads	CD=0	<2.13	92.0 - 4.24f
	CD=0	>2.13	98.45 - 7.27f

Source: Gifford, Hawkins, and Williams (1975).
a/ CD = cover density in percent.
b/ f = infiltration rate in inches per hour.

TABLE A-5
COEFFICIENTS FOR RUNOFF CURVE NUMBER (Y) AS A FUNCTION OF PERCENT COVER (X), AND Y = a - bX FOR VARIOUS VEGETATIVE TYPES AND SOIL GROUPS

Vegetative Type	Soil Group	a	b	Notes
Juniper-Grass	C	88	0.32	1/
	B	82	0.42	1/
Sage-Grass	C	86.5	0.46	1/
	B	73.5	0.415	1/
Herbaceous	D	95	0.115	1/
	C	90	0.19	1/
	B	84	0.25	1/
Oak-Aspen	C	79	0.44	1/
	B	74	0.51	1/
Desert Brush	D	93	0.06	2/ 3/
	C	80	0.06	2/ 3/
	B	84	0.06	2/ 3/
Ponderosa Pine	C	83	0.14	2/ 4/
	B	73	0.31	2/ 4/
Pasture or Rangeland	A	77	0.56	3/
	A	63	0.28	6/
	B	83	0.28	
	C	89	0.18	
	D	91	0.13	5/
Annual Grass	A	75	0.44	3/
	A	60	0.13	6/
	B	83	0.26	
	C	89	0.08	
	D	91	0.13	7/
Forests (precipitation = 25 inches)	A	50.5	0.286	
	B	71.5	0.229	
	C	81.5	0.229	
	D	87	0.21	7/
Roads	A	73	0.00	
	B	83	0.00	
	C	88.5	0.00	
	D	90.5	0.00	7/
Bare Rock	(N.A.)	96	0.00	8/
Water Surfaces	(N.A.)	100	0.00	

Note: All above curve numbers for AMC II and I_a = 0.2S, cover without rocks. 1/ From Enderlin and Markowitz (1962). 2/ From Simanton, Renard, and Sutter (1973). 3/ For X<50 percent. 4/ For 10 percent X<80 percent. Nonlinear relationship to Y = 92 and Y = 83, respectively at X = 0. 5/ From NEH-4 (in table form); reduced and converted to above coefficients. 6/ For X>50 percent. Note similarity between annual grass and rangeland coefficients except for Soil Group "A." 7/ From unpublished tables from USFS personnel (personal communication). 8/ Assumes (Initial Abstraction) = 0.08 inch.

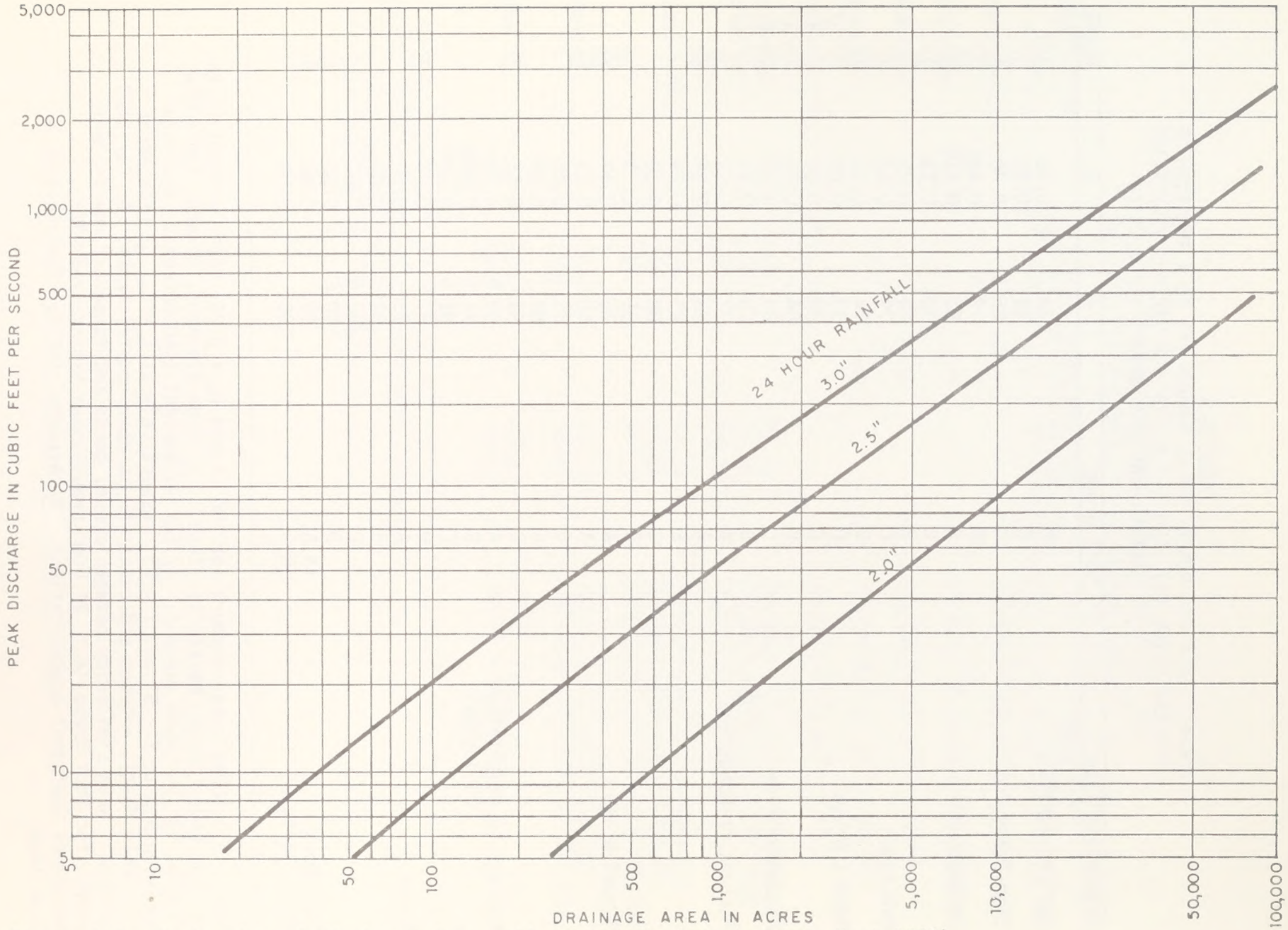


Figure A-7. Peak rates of discharge for small watersheds (adopted from Kent 1968)

APPENDICES

groups. (See table A-6.) The equation to represent this is $F_r = f + (f_o - f)t/T$ (inches per hour) where f_r is the rate at the end of the recovery period, f_o is the pre-grazing optimum rate defined by the hydrologic soil group, f is the beginning rate, t is the rest time in years, and T is the recovery time in years (in this case, four years). The limit of $t/T \leq 1$. (See table A-6.)

14. Future cover densities were calculated using the projected cover densities presented in the AMPs. Where the AMP cover densities did not coincide with Phase I data, the percent increase predicted in the AMP was applied to the cover densities used in step 5 above.

15. Future runoff and peak discharge estimates were made with the new infiltration rates and cover data as outlined in steps 5 through 11 above.

TABLE A-6
SAMPLE OUTPUT FOR REST ROTATION HYDROLOGIC IMPACT MODEL

From	To	Time (yr)	Activity	Infiltration Rate Begin	End	
1 Jan	16 Jan	1.46	Rest	1.80	1.92	a/
16 Jun	15 Aug	0.17	Heavy Cattle	1.92	1.12	
15 Aug	15 Oct	0.17	Rest	1.12	1.17	
15 Oct	25 Jan	0.28	Moderate Sheep	1.17	1.17	
25 Jan	16 Aug	0.56	Rest	1.17	1.30	
16 Aug	15 Oct	0.17	Moderate Cattle	1.30	1.30	b/
15 Oct	1 Jan	0.20	Moderate Sheep			

a/ Hydrologic Soil Group "B"; present infiltration rate under moderate grazing 1.80 inches per hour = 0.950 + 0.398 (2.13). Infiltration rate for ungrazed "B" is 2.13 inches per hour. End infiltration rate (1.92 inches per hour) = (2.13-1.80) 1.46/4 + 1.80.
b/ Tandem cattle and sheep counts as a single grazing, in this case at "moderate" level.

APPENDIX 4

METHODOLOGIES FOR DETERMINING RANGE CONDITION CLASSES AND CHANGES IN RANGE CONDITIONS; METHODOLOGIES FOR DETERMINING PRESENT AND PREDICTED VEGETATIVE PRODUCTION; PROCEDURES FOR DETERMINING SOIL PRODUCTIVITY POTENTIAL BY SOIL ASSOCIATION/VEGETATIVE TYPE

METHODOLOGY FOR ASSIGNING RANGE CONDITION CLASSES

Erosion condition classes (see Soils in chapter 2 for description) and the classification of plant species as desirable, intermediate, and least desirable were used to determine range condition. The following criteria were used in the plant classification process:

1. Desirable plants are those which are palatable, productive, and nutritious forage species, are often dominant under climax or near climax conditions, are long-lived, and have extensive root systems to aid in protecting the watershed against erosion. This category includes the important key forage species (grasses, forbs, browse, and shrubs) which are to be maintained or increased by intensive livestock management.

2. Intermediate plants are of secondary importance in the climax and are usually associated with, or indicators of, ecological successional stages. They replace the desirables as condition deteriorates and replace the least desirables as condition improves. They may be less palatable to grazing animals or be more resistant to grazing use.

3. Least desirable plants include those that are definitely the poorer species in an ecosystem and consist principally of annuals, invaders, and noxious and low-value forage plants.

The erosion condition classes and the above plant classifications result in the following range condition criteria:

1. Good Condition: Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. Erosion condition class is slight to stable.

2. Fair Condition: Composition is 15 to 39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Erosion condition class is less than critical. Also, those ecosystems where the composition comprises 60 percent or more of intermediate species and less than 5 percent of desirable species will be rated fair condition when the erosion condition class is moderate to stable.

3. Poor Condition: Composition is less than 15 percent desirable and intermediate species. Erosion condition class is critical to severe. (It should be noted that if the erosion condition class is critical to severe, the site is rated in poor condition regardless of the plant composition.)

These criteria were used by the Phase I watershed survey of the Uncompahgre Basin Resource Area, 1975. For example, an allotment in pinyon-juniper vegetative type could have the present situation shown in figure A-8. According to these criteria, this allotment would be rated in fair condition since there is 30 percent composition of species in the desirable and intermediate classes and the erosion condition class is less than critical.

METHODOLOGY FOR DETERMINING PREDICTED CHANGES IN RANGE CONDITIONS

The present range condition information was taken from the area watershed survey and information from allotment management plans (AMPs). The allotments in the environmental statement (ES) area presently under management systems or having received a vegetation manipulation treatment are reliable indicators of changes that could be expected. Changes recorded in cited studies (see chapter 3) of grazing systems in effect for several years and of vegetation manipulations were also used to help estimate expected changes. Such cited studies include Keng and Merrill 1960, Douglas 1915, Hormay 1970, Johnson 1965, McLean and Tisdale 1972, and Ratliff, Reppert, and McConnen 1972.

An example of changes which could be expected from implementation of grazing systems is a 25 percent increase in range condition with deferred rotation according to studies of Keng and Merrill (1960). A 25 percent increase under the system of condition classification used by this study would correspond to a one condition class change under the BLM system (such as from fair to good or poor to fair). Since rest rotation and deferred systems are considered in most literature to be equal to or superior to deferred rotation for vegetative response, it can be assumed that allotments under these systems will respond similarly.

Therefore, for the ES area it was concluded that:

1. All of the pinyon-juniper acreage receiving chaining and seeding would change to good condition by 2006.

2. All other vegetation manipulations would increase range condition one class above the present situation, for example, from poor to fair.

2 . Summary of grazing intensity--infiltration studies.

Site, Reference & Instrument	Grazing Intensity: Unger.	Light	Mod.	Heavy	Remarks
"Slick" or "Semislick" soils, Montana. Branson, et al. 1962. Tube type sprinkling infiltrometer.*	0.5	0.1		0.2	Unfurrowed
	0.1			0.3	Unfurrowed Dry plots, in 1958
	0.3	0.5		0.3	Furrowed & Seeded in 1948
	2.6	1.5		0.6	Furrowed & Seeded in 1948
	0.4	0.2		0.6	Unfurrowed
		0.3		0.3	Unfurrowed, Moist plots, 1959
	0.4	0.1		0.5	Furrowed & Seeded in 1948
	1.5	1.5		0.4	Furrowed & Seeded in 1948
Sandy loam soils, Utah, Chained P-J site. Gifford et al. 1976. Rocky Mountain infiltrometer.*	2.3		1.9		June 11, 1974 | Ungrazed=natural woodland, protected since 1968.
	2.6		2.3		June 19, 1974
	2.9		2.4		June 26, 1974 | Grazed=chained with windrowing, seeded. Grazed since 1974, ungrazed '68-'73
	2.5		2.6		July 9, 1974
	2.5		1.6		Aug. 20, 1974 | Chained and windrowed, seeded in 1964. Ungrazed since 1971.
	1.3		1.3		July 21, 1974
	1.5		1.2		Aug. 4, 1974
	1.4		1.9		June, 1975 | Ungrazed=exclosure on chained with windrowing, seeded site. Protected since 1968.
	2.0		1.2		August, 1975
	1.4		1.8		June 1976 | Moderately grazed area since '74, ungrazed '68-'73.
	1.1		1.0		Sept. 1976
Loams to clay loams, southwestern Alberta. Johnston, 1962. Mobile infiltrometer.		2.5(e)	2.0(g)	2.0(g)	Treatment age, 10 yr.
				1.7(p)	
Loamy fine sand, Oklahoma. Rhoades et al., 1964.	5.3(e)	2.2(g)	1.8(g)	1.6(f)	Sprinkler infiltrometer.
	12.2(e)	5.8(g)	5.0(g)	3.3(f)	Double ring infiltrometer. Treatment age, 20 yr.
Silty clay over clay, S. Dakota Sharp et al., 1964. 2-acre watersheds: rainfall minus runoff.		1.2	0.8	0.8	Storm of 5/30/63
		0.4	0.3	0.3	Composite data: May-July 1963
Gravelly loam, Arizona Tromble et al., 1974. Rainfall simulator.	1.6			1.2	Ungrazed protected 9 yr. Heavy grazing utilized 75%
Silty clay loam (loessal material), Kansas. Knoll & Hopkins, 1959, Single ring infiltrometer.	1.3		1.0	0.8	Ungrazed protected 13 yr.
Granitic alluvium, Colorado. Dortignac & Love, 1961. Rocky Mountain infiltrometer.*	2.0				1941 | Grassland. Ungrazed beginning 1941
	2.3	0.9	1.2	1.2	1947
	3.3	1.3	1.4	0.8	1954
	1.6				1941 | Ponderosa pine-grass Ungrazed beginning 1941
	2.9	1.5	1.6	1.8	1947
	2.6	1.8	2.3	0.8	1954
Silty clay, South Dakota. Rauzi & Hansen, 1966. Mobile infiltrometer.		3.0	1.7	1.0	Dry | Treatment age 22 yrs.
		1.3	0.7	0.5	Wet
Sandy loam & loams, Colorado. Rauzi & Smith, 1973 Mobile infiltrometer.*		1.8	2.0	0.8	Sandy loam | Treatment age 30 yrs.
		1.0	0.9	1.0	Sandy loam
		1.8	2.2	1.2	Loam
Various soils, North Dakota. Whitman et al., 1964. Probably ring infiltrometer		6.0	3.1		Ave. values over 7 major range soil types.
Shale derived soils, Colorado. Thompson, 1968. Rocky Mountain infiltrometer.*	0.7		0.8		1953 | Study began 1953
	0.9		1.1		1958 | (first year of protection
	0.7		0.8		1963

(Continued).

Site, Reference & Instrument	Grazing Intensity: Ungr.	Light	Mod.	Heavy	Remarks
Silt loam, Wyoming. Rauzi, 1956. Mobile infiltrometer. *		1.2		0.9	Treatment age 5 yrs.
Silt loams, North Dakota. Rauzi, 1963. Mobile infiltrometer.	4.3		2.4	1.5	Treatment age: Heavy 44 yr., modera 46 yr., ungrazed 21 yr.
Various soils, Montana. Reed & Peterson, 1961. Single ring infiltrometer.	7.3	4.4	4.3	2.8	Sandy loam.
	4.8			2.2	Clay soils. Average all data.
	4.3			1.4	Clay soils, Buffalo grass sod.
	4.8			2.5	Clay soil. Western wheatgrass.
	6.7			2.6	Silty clay soil, average all data.
	4.5			0.8	Silty clay soil, Buffalo grass sod.
	6.8			3.8	Silty clay soil, western wheatgrass. Age of treatment: 7 yr. ungrazed, al else 14 yr.
Silty loam, Idaho. Gifford, unpublished. Rocky Mountain infiltrometer*	1.7		1.4		June 1975 | Plowed big sagebrush
	1.6		1.4		August 1975 | site. Ungrazed 1975-
	1.1		0.9		June 1976 | Moderate since 1970;
	1.3		0.9		September 1976 | plowing & seeding in 1968.
Clay loams and sandy loams, Pennsylvania. Alderfer and Robinson, 1947. Type F rainfall simulator.			1.1	0.4	Clay loam, bluegrass-clover. Heavy = 50-60% cover. Moderate = 90% cover.
		1.4		0.8	Clay loam, bluegrass-clover. Heavy=80-85% cover. light = 100% cover.
			0.7	0.8	Sandy loam soil. Treatment age for both soils was 10 yrs.
Silt loam, Wyoming. Rauzi, 1954. Mobile infiltrometer.*	1.3	1.7	1.3	1.2	Ungrazed for 2 years
	1.2			0.7	Ungrazed for 13 years
Fine gravelly loams and silt loams, Wyoming. Rauzi, 1955. Mobile infiltrometer.*	1.2	1.2	1.3	1.2	Fine gravelly loams; ungrazed for 3 years.
	1.5	1.5	1.4	1.2	Silt loams; ungrazed for 3 years.
Silt loam, Louisiana Linnartz, et al., 1966. Double-ring infiltrometer.	1.8		1.1	0.7	Treatments 10 years old (spring and summer grazing). Mostly Andropogon spp. on clearcut longleaf pine forest site. Moderate grazing = 47% utiliza tion and heavy = 67% utilization.
Cecil, Madison, & Durham soils (texture not given), South Carolina. Holtan & Kirkpatrick, 1950. Type F infiltrometer.		1.2	0.7	0.6	Probably improved pasture situation. Exact conditions not given.

Notes: All above data in inches per hour. Symbol in parentheses represents range condition (where given) as follows: e = excellent; g = good; f = fair; p = poor.

* Reference provides an estimate of final infiltration rates (f_c) at the end of a specified time period with a sprinkling-type infiltrometer.

Source: Gifford and Hawkins, in press, "Hydrologic Impact of Grazing: A Critical Review," accepted for publication by Water Resources Research.

Plant Species	Percent Species Composition
Desirable	
Indian ricegrass (Orhy)	10
Intermediate	
Needle-and-thread (Stco)	5
Bottlebrush squirreltail (Sihy)	10
Sandberg bluegrass (Pose)	5
Undesirable	
Pinyon-juniper (Pied and Juos)	60
Burro weed (Appl)	5
Buckwheat (Erio)	5
	100

Soil Surface Factor = 50 (Moderate Erosion Condition Class)

Figure A-8. Example of criteria for determining present range condition class on an allotment in pinyon-juniper vegetative type.

3. All of the pinyon-juniper type in poor condition would change to fair under rest rotation, deferred rotation, and deferred systems. Because of canopy cover and the effect of shading and water loss, only one-half of the pinyon-juniper type in fair condition and under the above systems would change to good.

4. For allotments having other vegetative types and receiving rest rotation, deferred rotation, or deferred grazing systems, a one-class change in range condition is expected.

5. Allotments receiving custodial management with season-long use were expected to remain in the same condition class unless trend was upward, in which case, condition class would change upward one class, for example, from fair to good. Allotments receiving custodial management with fall or winter grazing would also change upward one class. All other custodial allotments would have no change in range condition by 2006.

For example 5017 Green Mountain has the present range condition acreages shown in table A-7. The allotment is proposed for a three-treatment rest rotation system, and 505 of the acres in poor condition would be chained and seeded.

As a result of the chaining and seeding, the 505 acres would change from poor to good (conclusion 1 above). All of the remaining 4,105 acres in poor condition (4,610 — 505 = 4,105), which would not be chained and seeded, would change to fair due to the rest rotation grazing system (conclusion 3 above). Similarly, of the 4,175 acres presently in fair condition, half (2,095 acres) would change to good condition, while the remaining 2,100 acres would remain in fair condition (conclusion 3 above). As a result, pinyon- juniper in good condition by 2006 would be 1,530 + 505 + 2,095 = 4,130; pinyon-juniper in fair condition would be 2,100 + 4,105 = 6,205.

Mountain shrub acreage would remain in the same condition class as the present, since it is in good condition already. Fair and poor condition classes in the sagebrush type would each increase one class in range condition (conclusion 4 above). Hence, in twenty years after implementation (by 2006), the predicted range condition classes would be as shown in table A-8.

METHODOLOGY FOR DETERMINING PRESENT PRODUCTION

Present production was taken from 1963 Range Survey Data for 365,385 acres of the ES area. For the remaining 146,840 acres of allotted land, present livestock and wildlife use compared with range trend and condition by allotment has been used to establish estimated production available for livestock and wildlife use. Since most of the information on wildlife numbers and use is available by game management unit, wildlife use was prorated to allotments based on the percentage of the allotment acreage of national resource lands (NRL) within the game management unit. Present livestock active use was accepted as the amount of actual use because actual use information is not available. Range trend and condition were used to determine whether the amount of use occurring under the present situation is proper or detrimental.

Allotments with no survey data, but in upward or static trend (122,245 acres), were assumed to have proper use occurring at present. Thus, production is at least equal to or greater than the use that occurs. From a conservative approach, allotment livestock and wildlife use under these conditions was assumed to be equal to allotment forage production.

On allotments where there were no survey data available and range trend is downward, a records search for a surveyed allotment in the area with similar range condition, trend, and vegetative types was used to establish an estimated acres per animal unit month (AUM) ratio and resultant production available for livestock and wildlife for each allotment. This method of estimating present production was used on 24 allotments (24,600 acres).

Present Production Methods Example

Allotment 4504 Leroux Creek (2,555 acres) is in downward trend and has no range survey data. It is composed of pinyon-juniper and mountain shrub vegetative types in fair condition. Allotment 4507 Jay Creek is a nearby allotment in the same vegetative types. It was surveyed at 13.06 acres per AUM in 1963. Hence, 2,555 acres ÷ 13.06 acres per AUM = 195.64 or 196 AUMs (estimated production).

TABLE A-7
5017 GREEN MOUNTAIN: PRESENT RANGE CONDITION AND TREND

Vegetative Type	Range Condition			Total Acres
	Good	Fair	Poor	
Pinyon-Juniper	1,530	4,195	4,610	10,335
Mountain Shrub	4,830	-	-	4,830
Sagebrush	630	4,440	590	5,660
TOTAL ACRES	6,990	8,635	5,200	20,825

TABLE A-8
5017 GREEN MOUNTAIN: PREDICTED RANGE CONDITION BY 2006

Vegetative Type	Range Condition			Total Acres
	Good	Fair	Poor	
Pinyon-Juniper	4,130	6,205	-	10,335
Mountain Shrub	4,830	-	-	4,830
Sagebrush	5,070	590	-	5,660
TOTAL ACRES	14,030	6,795	0	20,825

PREDICTED PRODUCTION METHODOLOGY

Production numbers for allotments in the ES area are conservative predictions based on experience, judgement, and the use of applicable studies. Consideration was first given to the present situation of each allotment, including the following vegetation evaluation components: present production, vegetative density, key species composition, range condition, and range trend. No rigorous estimates were made solely on the basis of climax vegetative conditions as adjusted by existing range condition class. Rather, potential productivities of the soils by pasture in each allotment were calculated on the basis of climax vegetation and used as a ceiling in predicting future production.

Next, the proposal for each allotment was analyzed with respect to the present situation. Aspects of the proposal which were applied include class of livestock, season of use, grazing system including improvements and vegetative manipulations, and an estimate of the present amount of wildlife use.

From this analysis, predictions were made for each allotment with and without the proposal. Applicable studies include studies of similar allotment management plans (AMPs) in the Montrose District and cited studies, such as Douglas 1915, Keng and Merrill 1960, Hormay 1970, Johnson 1965, McLean and Tisdale 1972, and Ratliff, Reppert, and McConnen 1972. These cited studies were related to this area by considering the overall climate of this area in relation to the climates of the cited studies. The twenty-year time frame was established as a consistent reference point in time for evaluation of all allotments in the ES area.

Predicted Production Methods Example

Allotment 5017 Green Mountain has vegetative production of 2,825 AUMs available for livestock and wildlife use (1963 range survey). Its present vegetative density and key species composition are shown in table A-9, and its acreage breaks down by vegetative type into the range condition classes shown in table A-7 (cited previously). All 20,825 acres are in downward trend.

The proposal would allow 639 AUMs of cattle use and 1,021 AUMs of sheep use under a spring-summer-fall, three-treatment rest rotation system, with 1,165 AUMs of wildlife use. The proposal also includes 5.5 miles of fence for dividing the allotment into four pastures, sixteen reservoirs and troughs, and 505 acres of chaining and seeding. Considering the system proposed and the present situation, etc., the 2006 production is predicted to be 3,725 AUMs for livestock and wildlife use, with the vegetative densities a key species composition shown in table A-10 and the range condition classes shown in table A-8 (cited previously).

PROCEDURES FOR ESTIMATING SOIL PRODUCTIVITY POTENTIAL BY SOIL ASSOCIATION/VEGETATIVE TYPE

Step 1

The first step was to determine the total pounds of vegetation that would be produced per acre within each of the soil associations. The production potential (total pounds of dry vegetation) for the individual soils was obtained from Soil Conservation Service (SCS) Soil Survey reports, printout, and range site description. (Each soil has been placed in a range site by the SCS, and then, through clippings, each site has been rated for its potential to produce vegetation in an average year based on climax vegetation.) The potential for the association was obtained by taking the percent of individual soils in the association and multiplying this by its production potential and then adding them together for a weighted average. Figure A-9 shows, as an example, the total production by soil association for 5017 Green Mountain allotment.

Step 2

In each pasture, soil associations were identified by vegetative type, and the number of acres within each category was measured by planimeter or by subjective review or (if all the area in a pasture was NRL and in the same soil association and vegetation type) by taking the acreage directly from the AMP.

Step 3

After the number of acres in each pasture by association/vegetation type was determined, it was multiplied by the soil productivity potential for that association, giving the total pounds of vegetation that would be potentially produced. The potential production was then divided by a

TABLE A-9
5017 GREEN MOUNTAIN: PRESENT VEGETATIVE DENSITY
AND KEY SPECIES COMPOSITION

Vegetative Type	Percent Veg. Dens.	Percent Key Species Composition			
		Kocr	Orhy	Amal	Atca
Pinyon-Juniper	40	-	T	-	1
Mountain Shrub	55	24	-	20	-
Sagebrush	42	20	5	5	-

Note: T = trace. Kocr = Koeleria cristata (Junegrass); Orhy = Oryzopsis hymenoides (Indian ricegrass); Amal = Amelanchier alnifolia (common serviceberry); Atca = Atriplex canescens (fourwing saltbush).

TABLE A-10
5017 GREEN MOUNTAIN: PREDICTED VEGETATIVE DENSITY
AND KEY SPECIES COMPOSITION BY 2006

Vegetative Type	Percent Veg. Dens.	Percent Key Species Composition			
		Kocr	Orhy	Amal	Atca
Pinyon-Juniper	60	-	10	-	10
Mountain Shrub	65	25	-	25	-
Sagebrush	55	25	10	10	-

Note: See note to table A-9 for key species.

Allotment 5017 Green Mountain
Acres NRL: 20,825
Acres Private: None

Present Production: 2,826 AUMs

Pasture No.	Acres	Grazeable Acres	Soil Association No.	Soil Productivity Potential by Assoc. Lbs. of Dry Veg./Acre	Potential Forage Productivity by Pasture Lbs. of Veg.	AUMs*	Expected 20 Yr. Forage Productivity With AMP	Expected 20 Yr. Forage Productivity Without AMP
1	4,440	2,665	7	1,600	4,264,000	2,370	805	391
1	5,645	280	5	1,500	420,000	235	89	39
TOTALS FOR PASTURE 1	10,085	2,945			4,684,000	2,605	894	430
2	3,090	2,840	7	1,600	4,544,000	2,525	902	418
2	520	160	5	1,500	240,000	135	48	22
TOTALS FOR PASTURE 2	3,610	3,000			4,784,000	2,660	950	440
3	2,800	2,700	7	1,600	4,320,000	2,400	865	400
3	700	300	5	1,500	450,000	250	85	40
TOTALS FOR PASTURE 3	3,500	3,000			4,770,000	2,650	950	440
4	2,640	2,600	7	1,600	4,160,000	2,310	810	383
4	990	400	5	1,500	600,000	335	121	37
TOTALS FOR	3,630	3,000			4,760,000	2,645	931	440
ALLOTMENT TOTALS	20,825	11,945			18,998,000	10,560	3,725	1,750

* Allow 1,800 pounds of vegetation per AUM.

Figure A-9. Example of procedure for determining production potential

requirement of 1,800 pounds per AUM (900 for livestock consumption and 900 for soil protection), which would be the amount of vegetation that would be necessary to maintain an AUM without deteriorating the range, as well as including unsuitable forage, etc. This step resulted in the potential number of AUMs that a pasture would be able to support.

APPENDIX 5

METHODOLOGIES FOR DETERMINING BIG GAME POPULATIONS AND BIG GAME BROWSE CONDITIONS; ELK AND DEER CRUCIAL WINTER AREAS WITH PROPOSED ALLOTMENTS, LIVESTOCK CLASS, AND SEASON OF USE

APPENDICES

METHODOLOGY FOR DERIVING BIG GAME POPULATIONS

The formulas used to derive the big game populations were provided by the Colorado Division of Wildlife. They are as follows:

1. Deer: (Harvest X 2) 2 = Base Population June 1 This formula assumes a total mortality other than harvest that is equal to the harvest (Harvest X 2). It also assumes that deer produce at the rate of 50 percent of base population.
2. Elk: (Harvest X 1.5) ÷ 0.4 = Base Population June 1

This formula assumes that elk populations have a natural mortality equal to 1.5 times the harvest and that elk produce at 40 percent of the base population. These formulas are for either-sex hunting and for herds that are maintaining their populations. Harvest would have to be doubled for bucks-only or bulls-only harvest; and adjustments would have to be made for increasing or decreasing herds.

Populations for the ES area were calculated using these formulas. After a population figure was determined for the game management unit (GMU), the amount or percentage of national resource lands (NRL) within the winter range was determined. This percentage was applied to the population, and the number of animals dependent on NRL some time during the year, primarily winter, was determined. Deer use on NRL averaged 36 percent in the ES area, and elk use averaged 12 percent. These populations are shown in tables 2-17 and 2-20.

METHODOLOGY FOR TABLES ON PRESENT BROWSE CONDITION

Forty-two browse transects were run in 1975 to determine browse condition and class. These transects utilized standard Bureau of Land Management (BLM) guidelines established in Manual 6630. They were run throughout the Uncompahgre Basin Resource Area by wildlife biologists.

The transects were grouped according to allotment, and the condition of the allotment was determined by averaging the transects and applying this average to a standard for good, fair, and poor condition (good = 80 to 100 satisfactory plants; fair = 40 to 79 satisfactory plants; and poor = 0 to 39 satisfactory plants). Then these ratings were grouped according to planning units in the resource area. Percentages of good, fair, and poor allotments were determined, and these percentages were applied to the crucial area acreages within the allotments according to what planning unit they are in. This gave the number of acres within each class within each allotment as shown in tables 2-13, 2-14, 2-15, and 2-16.

In allotments where transects were run, the allotments were considered by themselves. For example, if a transect showed good browse condition and it was the only transect run in that allotment, the entire allotment was considered in good condition; if the transects showed 70 percent in poor condition and 30 percent in fair condition, these percentages were applied to the acres of crucial area within that allotment to determine the acres in each category.

Allotments in noncrucial areas were only those where pinyon juniper, sagebrush, or mountain shrub is located; therefore, not all allotments or all acreages appear in these tables. These three vegetation types were rated as providing the bulk of winter forage for deer or similar ranges in Utah (U.S. Department of the Interior 1974, p. 28).

METHODOLOGY FOR TABLES ON FUTURE BROWSE CONDITION

The assumption was made that the vegetative density predicted in the vegetation section would occur. The present density was subtracted from the future density, yielding the net increase. This net increase was assumed to be equal to the predicted percent increase of satisfactory browse plants (primarily in the seedling and young plant classes).

The percent increase was then multiplied by the number of satisfactory plants in each of the 42 browse transects. This gave the increase in the number of satisfactory plants. This was then added to the original number to obtain the number of satisfactory plants in the future. This number was then compared to the criteria established for determining good, fair, and poor, and the future browse condition was determined. An example is shown in figure A-10.

By applying the methodology for tables 2-13 through 2-16, showing present browse condition, the number of acres in good, fair, and poor condition were determined and these figures are shown in tables 3-11, 3-12, and 3-13, showing future browse condition.

Let:

D = Percent Density Change
Pp = Present Percent Density of pinyon-juniper, mountain shrub, sagebrush
Pf = Future Percent Density
Sp = Number of Satisfactory Plants - Present
Sc = Number of Satisfactory Plants - Change
Sf = Number of Satisfactory Plants - Future

Allotment 5516 Piney

Pf - Pp = D	0.100 - 0.75 = 0.25
D X Sp = SC	0.25 X 78 = 19.5
Sc + Sp = SF	19.5 + 78 = 97.5

Browse Condition Criteria

Good - 80 to 100 Satisfactory Plants
Fair - 40 to 79 Satisfactory Plants
Poor - 0 to 39 Satisfactory Plants

These condition criteria are based on BLM Manual 6600.24 and adjusted to three species (pinyon-juniper, mountain shrub, and sagebrush). The 5516 Piney and the 5507 Pipeline allotments changed condition class; all others remained in their respective condition class.

Figure A-10. Example of how to determine future browse condition

TABLE A-11
DEER CRUCIAL WINTER AREAS WITH PROPOSED ALLOTMENTS, LIVESTOCK CLASS, AND SEASON OF USE

Crucial Area a/	Allotment & Proposed Management b/	Acres Crucial	Acres Total	Livestock Class-AUMs c/	Season of Use
Deer Basin	4017 Alkali Flats, Pipeline Pasture (RR)	320	6,135	S-256	12/01-05/07
	4516 North Fork: Subunit M Deer Basin, Deer Basin Pasture (RR)	960	3,440	S-334	11/16-04/17
Negro Mesa	4017 Alkali Flats, Pipeline Pasture (RR)	240	6,135	S-256	12/01-05/07
	4025 Ward Creek-Doughspoon, Pasture #4 (RR)	240	3,730	C-87	05/11-06/15 10/16-11/15
Oak Creek	4024 Dirty George, South Branch Pasture (RR)	800	1,165	C-123	05/16-06/15 10/16-11/01
	4025 Ward Creek-Doughspoon, Pasture #1 (RR)	840	3,460	C-95	05/11-06/15 10/16-11/15
Camp Ridge	4001 Dominguez (RR)	15,360	58,335	C-2,068	04/16-05/15 10/16-01/30
Dry Mesa	4006 Dry Mesa: Subunit B Dry Mesa (RR)	8,480	16,265	C-489	05/08-05/31 11/01-12/31
Cottonwood Mesa	4005 Fall Cabin (C)	360	360	C-18	05/11-05/31 10/16-10/31
	4007 Sawmill Mesa (D)	1,840	12,095	C-341	11/01-12/15
	4008 25 Mesa (D)	600	10,405	C-773	10/15-02/28 05/03-05/05
Monitor Mesa	4010 Monitor Mesa (RR)	3,280	15,735	C-1,174	05/16-05/31 10/16-11/30
	4014 Joker (C)	560	1,835	C-87	05/21-10/31
Winter Mesa	4010 Monitor Mesa (RR)	4,480	15,735	C-1,174	05/16-05/31 10/16-11/30
Camel Back	4012 Canal, Pasture 4 (RR)	840	2,690	C-261	05/15-07/31 10/16-11/15
Pea Green	4012 Canal, Pastures 3 & 4 (RR)	1,240	6,170	C-545	05/15-07/31 10/16-11/15
	4013 Ben Lowe, Ben Lowe & Cedar Pastures (RR)	2,120	3,435	C-297	05/21-05/31 11/16-11/30
Leroux Creek	4503 Stingley Gulch (RR)	1,080	1,080	C-98	05/10-06/09
	4549 Dry Creek (DR)	1,200	3,110	C-193	05/16-06/15 10/01-11/03
Horse Park	4504 Leroux Creek (RR)	1,595	2,555	C-190	05/16-09/15
	4506 Oak Mesa: Subunit G (RR)	320	600	S-18	09/15-09/21
	Subunit H (RR)	750	750	S-40	06/23-06/30 08/15-08/28

a/ Identified by geographical feature.
b/ RR = rest rotation; DR = deferred rotation; C = custodial; E = elimination of grazing.
c/ C = cattle; S = sheep; H = domestic horses.

TABLE A-11
DEER CRUCIAL WINTER AREAS WITH PROPOSED ALLOTMENTS, LIVESTOCK CLASS, AND SEASON OF USE (cont.)

Crucial Area a/	Allotment & Proposed Management b/	Acres Crucial	Acres Total	Livestock Class-AUMs c/	Season of Use
Oak Mesa	4507 Jay Creek (RR)	2,340	9,205	C-1,033	05/16-10/31
	4509 Upper Jay Creek (C)	240	430	C-66	05/20-06/15 09/15-10/30
Wakefield Mesa	4507 Jay Creek (RR)	1,600	9,205	C-1,033	05/16-10/31
	4511 Overland (C)	160	160	C-14	06/16-06/30 10/16-10/30
	4512 East Roatcap (C)	30	30	C-10	06/19-10/12
	4513 Stevens Gulch: Subunit I Roatcap (RR)	920	2,120	C-225	05/16-06/15 09/01-09/30
Fry Mesa	4513 Stevens Gulch: Subunit I Roatcap (RR)	320	2,120	C-225	05/16-06/15 09/01-09/30
	Subunit J Terror Creek (RR)	760	4,435	C-444	05/27-06/15 09/01-10/30
Terror Creek	4513 Stevens Gulch: Subunit J Terror Creek (RR)	1,720	4,435	C-444	05/27-06/15 09/01-10/30
	4515 Freeman Gulch	320	620	C-53	06/01-10/31
Paonia Reservoir	4525 Anthracite Creek (RR)	680	1,115	C-117	06/04-09/01
Watson Flats	None	-	-	-	-
Minnesota Creek	4527 Jumbo Mountain (RR)	2,160	4,930	C-574	05/11-06/15 09/16-10/20
	4528 Oak Ridge (RR)	520	3,600	C-238	05/20-06/15 10/01-11/04
Reynolds Creek	4529 Reynolds Creek (DR)	1,080	1,200	C-158	06/05-06/20 10/06-10/11
	4530 McDonald Mesa (DR)	2,040	3,185	C-122	05/01-06/20 10/07-10/13
	4537 Young's Peak: Subunit Q Young's Peak (RR)	280	2,260	C-113	05/15-07/14 09/01-09/30
Fruitland Mesa	5011 Gould Reservoir (RR)	1,680	2,825	C-203	05/05-06/30 09/05-10/31
	5012 Cedar Point (C)	120	620	C-55	05/30-06/30 09/01-09/30
	5013 Iron Canyon (RR)	920	1,335	C-63	05/15-07/10 09/06-10/31
	5014 Poison Springs (RR)	1,450	1,570	C-66	05/15-07/14 09/01-10/31
	5017 Green Mountain (RR)	13,440	20,825	S-1,021	05/15-07/04 09/15-11/12
				C-639	05/15-07/14
	5038 Red Canyon (C)	80	80	C-3	05/10-10/30
	5039 Onion Valley (C)	40	40	C-16	07/01-09/01
				H-1	09/01-11/15
Black Ridge	4516 North Fork: Subunit M Deer Basin, Smith Fork Pasture (RR)	3,725	3,725	S-102	11/16-04/17
	5020 Black Ridge (RR)	6,875	6,875	S-400	04/04-08/31
	5022 Rabbit Gulch (D)	1,250	1,250	C-35	11/10-12/14

TABLE A-11
DEER CRUCIAL WINTER AREAS WITH PROPOSED ALLOTMENTS, LIVESTOCK CLASS, AND SEASON OF USE (cont.)

Crucial Area a/	Allotment & Proposed Management b/	Acres Crucial	Acres Total	Livestock Class-AUMs c/	Season of Use
Dry Fork Escalante	5502 Sandy Wash (RR)	2,560	7,530	S-707	12/01-03/16
	5505 Transfer (D)	2,000	2,970	C-214	10/16-11/16
	5507 Pipeline (RR)	3,080	19,190	C-1,560	03/16-05/09 10/16-12/07
	5513 Dry Creek Basin (D)	1,760	5,425	S-300	11/01-01/31
	5516 Piney (RR)	680	8,335	C-540 H-17	06/01-10/31
Highway 90	5507 Pipeline (RR)	5,360	19,190	C-1,560	03/16-05/09 10/16-12/07
	5521 Highway 90, Pastures 4 & 6 (RR)	1,000	2,465	S-117	03/25-06/02
Happy Canyon	5522 Beaver Hill (RR)	2,160	19,785	S-934	05/16-06/30 10/01-10/20 12/08-12/28
	5517 Spring Creek Canyon (C)	440	440	C-35	05/31-10/15
Log Hill Mesa	None	-	-	-	-
Ridgway Area	None	-	-	-	-
Along Highway 550	5529 Log Hill (RR)	120	4,345	C-153	05/16-06/13 10/16-10/31
	5530 Billy Creek (RR)	240	3,995	C-135	05/10-06/25 08/20-09/25
				H-2	05/10-06/25
	5552 Dallas (E)	80	240		Elimination
	5553 Fisher Creek (E)	480	480		Elimination
	5557 Alkali (E)	160	485		Elimination
	5560 Cookie Tree (E)	280	640		Elimination
	5572 McKenzie Creek (E)	110	110		Elimination
Cerro Summit	5003 Selig Canal: Subunit T Rawhide-Coffeepot (C)	480	2,005	S-32	05/16-05/25 10/01-10/10
	5569 Hairpin (RR)	500	500	S-19	10/01-10/06
TOTALS		113,745	301,415 d/	17,762 d/	

d/ An allotment or allotment subunit may be listed more than once because it falls into more than one crucial area. However, the total acreage and the AUMs for each allotment or subunit were added in only once when these columns were totaled.

TABLE A-12

ELK CRUCIAL WINTER AREAS WITH PROPOSED ALLOTMENTS, LIVESTOCK CLASS, AND SEASON OF USE

Crucial Area a/	Allotment & Grazing System b/	Acres Crucial	Acres Total	Livestock Class-AUMs c/	Season of Use
Leroux Creek	4503 Stingley Creek (RR)	240	1,080	C-98	05/10-06/09
	4549 Dry Creek (DR)	560	3,110	C-193	05/16-06/15 10/01-11/03
Horse Park	4504 Leroux Creek (RR)	1,600	2,555	C-190	05/16-09/15
	4506 Oak Mesa:				
	Subunit G (RR)	80	1,350	S-18	09/15-09/21
	4507 Jay Creek (RR)	480	9,205	C-1,033	05/16-10/30
Oak Mesa	4507 Jay Creek (RR)	1,600	9,205	C-1,033	05/16-10/30
	4509 Upper Jay Creek (C)	300	430	C-66	05/20-06/15 09/15-10/30
Wakefield Mesa	4513 Stevens Gulch:				
	Subunit I Roatcap (RR)	1,800	2,120	C-225	05/16-06/15 09/01-09/30
Fry Mesa	4513 Stevens Gulch:				
	Subunit I Roatcap (RR)	80	2,120	C-225	05/16-06/15 09/01-09/30
	Subunit J Terror Creek (RR)	240	4,435	C-444	05/27-06/15 09/01-10/30
Terror Creek	4513 Stevens Gulch:				
	Subunit J Terror Creek (RR)	1,240	4,435	C-444	05/27-06/15 09/01-10/30
	4515 Freeman Gulch (C)	280	620	C-53	06/01-10/31
Paonia Reservoir	4520 Spring Creek (C)	120	120	C-25	06/12-09/15
Watson Flats	None	-	-	-	-
Minnesota Creek	4527 Jumbo Mountain (RR)	1,120	4,930	C-574	05/11-06/15 09/16-10/20
	4528 Oak Ridge (RR)	320	3,600	C-238	05/21-06/15 10/16-11/04
Reynolds Creek	4529 Reynolds Creek (DR)	560	1,200	C-158	06/05-06/20 10/06-10/11
	4530 McDonald Mesa (DR)	520	3,185	C-122	05/01-06/20 10/07-10/13
	4540 North Saddle Peak (DR)	120	240	C-33	06/01-08/31
TOTALS		11,260	38,180 d/	3,470 d/	

a/ Identified by geographical feature.
b/ RR = rest rotation; DR = deferred rotation; C = custodial.
c/ C = cattle; S = sheep.
d/ An allotment or allotment subunit may be listed more than once because it falls into more than one crucial area. However, the total acreage and the AUMs for each allotment or subunit were added in only once when these columns were totaled.

APPENDIX 6

PROCEDURES USED TO IDENTIFY ARCHEOLOGICAL SITES; RECORDED ARCHEOLOGICAL SITES IN THE ES AREA

APPENDICES

PROCEDURES USED TO IDENTIFY ARCHEOLOGICAL SITES

The identification of cultural resources within the environmental statement (ES) area was accomplished in three ways:

1. comprehensive literature search of published and unpublished accounts of archeological research in the area;
2. search of the Office of the State Archaeologist's site files;
3. statistically reliable sampling inventory of the area by the University of Colorado (CU) for the purpose of building a predictive probability model of site location.

Results of Literature Search and Site File Search

Prior to the implementation of the ES study, a variety of research had been carried out within the bounds of the ES area. Much of the work had been done during the 1930s and 1940s by amateur, semi-professional, and professional archeologists (cf. Huscher 1939, Huscher and Huscher 1940, Huscher and Huscher 1943, Schroeder 1953, Wormington and Lister 1956, Hurst 1957, Schroeder 1964, Peterson 1970).

During the 1950s a review of the accumulated data was begun by Wormington and Lister (1956). It culminated in the definition of the Uncompahgre Complex. The Uncompahgre Complex has been defined as a continuous localized cultural manifestation (identified by certain artifact types) of the archaic stage of development. Human adaptation manifests itself as archeological sites relecting effective and efficient exploitation of all ecological zones within the area. The presumed level of human development was a hunting-gathering level of society that revolved around a seasonal round of hunting and gathering of food resources in the various local ecozones. Twelve different phases have been identified within the complex that reflect specific responses to outside influence and environmental change through time. The earliest identified phase dates from 8000 B.C. and defines a paleo-Indian period of use and occupation. The final phase ends about A.D. 1880 with the movement of the Utes out of the Uncompahgre area. The occupation of the area has been demonstrated to have been continuous with changes in artifact styles which probably reflect corresponding adaptations to changes in the environment and outside influence. The archaic style of life did not dramatically change, however, until the advent of intensive white contact. The seasonal round followed by the groups residing in the Uncompahgre area has been defined as being very similar to the lifestyle of the contact period Utes.

This inventory work was expanded by Buckles (1971), and since that time professional archeologists have been working in the area for various governmental agencies. The result of recent inventories has been further substantiation of the previous works that defined the aboriginal use of the area (cf. Lister and Sandburg 1963, Smith 1966, Jennings 1968, Buckles 1968, Ambler 1969, Breternitz 1973, Breternitz et al. 1974, Carpenter and Stiger 1975, Breternitz and Breternitz 1975, Williams 1975, Breternitz and Williams 1976).

Results of the University of Colorado Sampling Study

Before the implementation of the CU study, approximately 14,045 acres of the ES area had been inventoried, as a result of Montrose District needs to clear specific project areas. This inventoried area cannot be considered statistically reliable for projection purposes. However, this acreage accounts for approximately 2.75 percent of the total ES area. The 2.75 percent previously inventoried and the statistically sampled area bring the total area inventoried to approximately 4 percent.

The CU study team utilized a stratified random sampling design to sample the ES area. A detailed analysis of the research design, results of the survey, and the predictive model is available at the Montrose District Office. The project area was subdivided according to topographic situation and was broken down as follows: river bottom, talus, mesa top/terrace/bench, "adobe" hills (a badlands topography of decomposed Mancos shale), and canyon rim. The land was then examined in each major drainage, and a stratification and distribution of sample areas was produced. The sample areas were then examined on foot by the team. In the various topographic zones, 118 sites were recorded. Predictive probability statements were then generated, based on sites recovered. Preliminary calculations indicate that the sample is accurate to the 0.001 level of significance with 4 degrees of freedom.

The raw score predictions indicate that there may be 6,050 sites in the ES area. Sites are more

APPENDICES

likely to occur on canyon rims, terrace/mesa tops/bench, and talus slopes. Specific predictions are as follows: rim areas 1,395 sites; terrace/mesa top/bench, 2,827; talus, 1,733; adobe hill, 78; valley bottom, 17.

In view of the nonrandom nature of site location, the temporal span of site types, the topographic discontinuity of the area, and the low level of inventory, extreme caution must be exercised in the interpretation of the predictive model. The degree of concentration of sites in examined parcels suggests that the predictive statement for terrace and valley bottom may be somewhat underestimated, and that the total number of canyon rim sites may be slightly higher than predicted. The low level of statistical inventory and the low level of total land use area inventoried does not lend itself well to extremely confident predictive statements.

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5MN1	Rockshelter	Poor	L	0.5*	BLM
5MN2 Hauser Site	Rockshelter w/petroglyphs	Poor	L	0.5*	BLM (excavated)
5MN3	Rockshelter	Fair	L	0.5*	PVT
5MN4	Rockshelter w/petroglyphs	Good	L	0.5*	BLM (excavated)
5MN5 Three Bears Site	Rockshelter	Good	L	0.5*	PVT
5MN6 Frank's Site	Rockshelter	Poor	L	0.5*	PVT (excavated)
5MN7	Rockshelter w/petroglyphs	Poor	L	0.5*	PVT
5MN8	Rockshelter	Fair	L	0.5*	PVT
5MN9	Rockshelter	Fair	L	0.5*	PVT (excavated)
5MN10	Rockshelter	Good	L	0.5*	PVT (excavated)
5MN11	Rockshelter	Fair	L	0.5*	BLM
5MN12	Rockshelter	Fair	L	0.5*	BLM
5MN13 McMillen Site	Historic Ute	Fair	L	0.5*	BLM (excavated)
5MN14 Carlyle Shelter	Rockshelter w/petroglyphs	Fair	L	0.5*	BLM (excavated)
5MN15 Juanita's Shelter	Rockshelter	Fair	L	0.5*	BLM (excavated)
5MN16	Rockshelter	Fair	L	0.5*	BLM
5MN17 Initial Site	Open camp	Fair	L	0.5*	BLM (excavated)
5MN18	Rockshelter	Poor (vandalized)	L	0.5*	BLM (excavated)
5MN19	Rockshelter	Poor (vandalized)	L	0.5*	BLM
5MN20	Rockshelter	Poor (vandalized)	L	0.5*	BLM (excavated)
5MN21	Rockshelter	Poor (vandalized)	L	0.5*	BLM
5MN22	Rockshelter	Poor (vandalized)	L	0.5*	BLM
5MN23	Rockshelter w/burials	Fair	L	0.5*	PVT
5MN24	Rockshelter	Fair	L	0.5*	PVT
5MN25	Rockshelter	Fair	L	0.5*	PVT (excavated)

a/ Poor = heavily disturbed or vandalized; Fair = moderately disturbed; Good = little disturbance and integrity intact; Excellent = slight to no disturbance with integrity intact.
b/ L = local; S = state; N = national.
c/ BLM = Bureau of Land Management; PVT = private; USFS = U.S. Forest Service; NPS = National Park Service.
* 0.5 or less.

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5MN26	Rockshelter	Fair	L	0.5*	PVT (excavated)
5MN27 Shavano Picture Rock Site	Open camp w/petroglyphs	Fair	L	0.5*	PVT (excavated)
5MN28 Shirley's Shelter	Rockshelter	Good	S,L	0.5*	BLM (excavated)
5MN29	Rockshelter	Good	S,L	0.5*	BLM
5MN30 Monte's Shelter	Rockshelter w/petroglyphs	Fair/Good	L	0.5*	BLM
5MN31	Rockshelter	Fair	L	0.5*	BLM
5MN32	Open site	Fair/Good	L	0.5*	BLM
5MN33 Cushman Creek Site	Open site	Good	L	0.5*	BLM (excavated)
5MN34 Squint Site	Open site	Good	L	0.5*	BLM (excavated)
5MN35 Bedrock Pit Site	Open site	Fair	L	0.5*	BLM (excavated)
5MN36	Open site and rockshelter	Good	S,L	0.5*	BLM (excavated)
5MN37	Rockshelter	Excellent	S,L	0.5*	BLM (excavated)
5MN38 Childer's Site	Open site	Good	L	0.5*	BLM (excavated)
5MN39	Open site	Fair/Good	L	0.5*	BLM
5MN40 Shavano Spring Site	Open site (historic)	Poor	L	0.5*	PVT (excavated)
5MN41 Lee Ranch Wickiup	Wickiup	Good	N,S,L	0.5*	PVT (excavated)**
5MN42	Wickiup (historic)	Fair/Good	S,L	0.5*	BLM
5MN43 Sandburg Site	Rockshelter	Fair/Good	N,S,L	0.5*	BLM (excavated)**
5MN44 Monitor Mesa Wickiup	Wickiup (historic)	Good	L	0.5*	BLM (excavated)
5MN45	Open site	Good	L	0.5*	BLM
5MN46	Open site (historic)	Poor	L	0.5*	BLM
5MN47 Beaver Hill	Open site (historic)	Poor	L	0.5*	PVT
5MN48 Cornforth Site	Open site	Fair	L	0.5*	PVT (excavated)
5MN49	Open site	Fair	L	0.5*	PVT
5MN50	Rockshelter	Fair/Good	L	0.5*	BLM
5MN51	Rockshelter	Good	L	0.5*	BLM (excavated)
5MN52	Rockshelter	Fair	L	0.5*	BLM
5MN53	Open site	Fair	L	0.5*	BLM (excavated)
5MN54	Open site	Good	L	0.5*	BLM (excavated)
5MN55	Open site	Poor	L	0.5*	BLM (excavated)
5MN56	Open site	Fair	L	0.5*	BLM
5MN57 Frank Bond Site	Open site	Poor	L	0.5*	PVT (excavated)
5MN58 Caddy Site	Open site	Poor	L	0.5*	PVT (excavated)

** Nominated to National Register of Historic Sites and Places.

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5MN59	Open site	Poor	L	0.5*	PVT
5MN60	Open site	Fair	L	0.5*	BLM
5MN61	Rockshelter	Fair	S,L	0.5*	BLM (excavated)
5MN62	Rockshelter	Fair	L	0.5*	BLM (excavated)
5MN63	Rockshelter	Fair	L	0.5*	BLM (excavated)
5MN64 Cushman Creek Picture Rock Site	Petroglyph	Poor	L	0.5*	BLM
5MN65	Wickiup (historic)	Poor	L	0.5*	BLM
5MN66 Split Rock Site	Petroglyphs	Fair	L	0.5*	PVT
5MN67 Shavano Falls Petroglyph Site	Petroglyphs	Fair	L	0.5*	PVT
5MN68	Rockshelter w/petroglyphs	Poor	L	0.5*	PVT
5MN69	Rockshelter w/petroglyphs	Poor	L	0.5*	PVT
5MN70	Open site	Fair	L	0.5*	BLM
5MN171	Open site	Fair	L	0.5*	NPS
5MN172	Open site	Fair	L	0.5*	NPS
5MN173	Open site	Fair	L	0.5*	NPS
5MN174	Open site	Fair	L	0.5*	NPS
5MN175	Open site	Fair	L	0.5*	NPS
5MN176	Open site	Fair	L	0.5*	NPS
5MN177	Open site	Fair	L	0.5*	NPS
5MN178	Open site	Fair	L	0.5*	NPS
5MN179	Open site	Fair	L	0.5*	NPS
5MN180	Open site	Fair	L	0.5*	NPS
5MN181	Open site	Fair	L	0.5*	NPS
5MN182	Open site	Fair	L	0.5*	NPS
5MN183	Open site	Fair	L	0.5*	NPS
5MN184	Wickiup	Fair	L	0.5*	NPS
5MN185	Open site	Fair	L	0.5*	NPS
5MN186	Open site	Fair	L	0.5*	NPS
5MN187	Open site	Fair	L	0.5*	NPS
5MN188	Open site	Fair	L	0.5*	NPS
5MN194	Open site	Fair	L	0.5*	NPS
5MN195	Open site	Fair	L	0.5*	NPS
5MN196	Open site	Fair	L	0.5*	NPS
5MN197	Open site	Fair	L	0.5*	NPS

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5MN198	Open site	Fair	L	0.5*	NPS
5MN199	Open site	Fair	L	0.5*	NPS
5MN200	Open site	Fair	L	0.5*	NPS
5MN201	Open site	Fair	L	0.5*	NPS
5MN202	Open site	Fair	L	0.5*	NPS
5MN203	Open site	Fair	L	0.5*	NPS
5MN204	Open site	Fair	L	0.5*	NPS
5MN205	Open site	Fair	L	0.5*	NPS
5MN206	Open site	Fair	L	0.5*	NPS
5MN207	Open site	Fair	L	0.5*	NPS
5MN208	Open site	Fair	L	0.5*	NPS
5MN209	Open site	Fair	L	0.5*	NPS
5MN210	Open site	Fair	L	0.5*	NPS
5MN211	Open site	Fair	L	0.5*	NPS
5MN212	Open site	Fair	L	0.5*	NPS
5MN213	Rockshelter	Fair	L	0.5*	NPS
5MN444	Open site	Good	L	0.5*	BLM
5MN445	Open site	Fair	L	0.5*	BLM
5MN446	Open site	Fair	L	0.5*	BLM
5MN447	Open site	Fair	L	0.5*	BLM
5MN448	Open site	Good	L	0.5*	BLM
5MN449	Open site	Good	L	0.5*	BLM
5MN500	Open site	Good	L	0.5*	BLM
HD-3-7	Wickiup (historic)	Poor	L	0.5*	BLM (excavated)
Moore Site	Rockshelter	Good	N,S,L	0.5*	BLM (excavated)**
Casabier Site	Rockshelter	Good	S,L	0.5*	BLM (excavated)
D01	Petroglyphs	Unknown	Unknown	Unknown	BLM
D02	Petroglyphs	Unknown	Unknown	Unknown	BLM
D03	Petroglyphs	Unknown	Unknown	Unknown	BLM
D014	Surface structure	Unknown	Unknown	Unknown	BLM
5DT1 Dry Fork Petroglyphs	Petroglyphs	Good	N,S,L	0.5*	BLM**
5DT2 Christmas Rockshelter	Rockshelter	Fair	N,S,L	0.5*	BLM (excavated)
5DT3	Open site	Good	L	0.5*	BLM**
5DT4 Escalante Crossing Petroglyphs	Petroglyphs	Good	L	0.5*	PVT
5DT40	Open site	Fair	L	0.5*	BLM
5DT41	Open site	Poor	L	0.5*	BLM
5DT42	Open site	Fair	L	0.5*	PVT
5DT43	Open site	Poor	L	0.5*	BLM
5DT44	Open site	Poor	L	0.5*	BLM
5DT45	Open site	Poor	L	0.5*	BLM

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5DT46	Open site	Poor	L	0.5*	BLM
5DT47	Open site	Poor	L	0.5*	BLM
5DT48	Open site	Poor	L	0.5*	BLM
5DT49	Open site	Poor	L	0.5*	BLM
5DT50	Open site	Poor	L	0.5*	BLM
5DT51	Open site	Fair	L	0.5*	BLM
5DT52	Open site	Fair	L	0.5*	BLM
5DT53	Open site	Poor	L	0.5*	BLM
5DT54	Open site	Fair	L	0.5*	BLM
5DT55 Roubideau Site	Open site	Fair	L	0.5*	BLM
5DT56	Open site	Fair	L	0.5*	BLM
Snake Rock Petroglyphs	Petroglyphs	Good	L	0.5*	BLM
5DT57	Open site	Poor	L	0.5*	BLM
5DT58	Open site	Poor	L	0.5*	PVT
5DT59	Rockshelter	Poor	L	0.5*	BLM
5DT60	Open site	Fair	L	0.5*	PVT
5DT61	Rockshelter	Good	S,L	0.5*	BLM
5DT62	Open site	Good	S,L	0.5*	BLM
5DT63	Rockshelter	Good	S,L	0.5*	BLM
5DT64	Rockshelter w/historic petroglyphs	Poor	S,L	0.5*	PVT
5DT65	Rockshelter	Good	L	0.5*	PVT
5DT66	Open site	Good	L	0.5*	BLM
5DT67	Open site	Good	L	0.5*	BLM
5DT68	Rockshelter w/historic petroglyphs	Good	L	0.5*	BLM
5DT69	Rockshelter	Poor	L	0.5*	BLM
5DT70	Rockshelter	Good	L	0.5*	PVT
5DT114	Petroglyphs	Destroyed	None	None	BLM
5ME1 Escalante Fork Petroglyphs	Petroglyphs	Good	L	0.5*	BLM (excavated)
5ME180	Open site	Fair	L	0.5*	BLM
5ME181	Open site	Poor	L	0.5*	BLM
5ME182	Open site	Fair	L	0.5*	BLM
5ME200	Open site	Good	L	0.5*	BLM
5OR2	Open site	Poor	L	0.5*	PVT
5OR3	Open site	Poor	L	0.5*	PVT
5OR4	Open site	Poor	L	0.5*	PVT
5OR5	Open site	Poor	L	0.5*	BLM
5OR6	Structure	Fair	L	0.5*	PVT
5OR7	Open site	Poor	L	0.5*	PVT
5OR8	Open site	Poor	L	0.5*	PVT

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
5OR9	Open site	Poor	L	0.5*	PVT
5OR10	Open site	Poor	L	0.5*	PVT
5OR11	Open site	Fair	L	0.5*	PVT
5OR12	Open site	Poor	L	0.5*	PVT
5OR13	Anglo historic	Fair	S,L	0.5*	PVT
5OR14	Anglo historic	Fair	S,L	0.5*	PVT
5OR15	Open site	Fair/Good	L	0.5*	PVT
5OR16	Open site	Fair	L	0.5*	PVT
5OR17	Open site	Poor	L	0.5*	PVT
5OR18	Open site	Poor	L	0.5*	PVT
5OR19	Open site	Poor	L	0.5*	PVT
5OR20	Open site	Poor	L	0.5*	PVT
5OR21	Open site	Poor	L	0.5*	PVT
5OR22	Open site	Poor	L	0.5*	PVT
5OR23	Open site	Poor	L	0.5*	PVT
5OR24	Open site	Poor	L	0.5*	BLM
	1976 University of Colorado Inventory				
5MN472	Open site	Poor	L	0.5*	BLM
5MN473	Open site	Poor	L	0.5*	BLM
5MN474	Open site	Poor	L	0.5*	BLM
5MN475	Open site	Poor	S,L	0.5*	BLM
5MN476	Open site	Fair	L	0.5*	BLM
5MN477	Open site	Good	L	0.5*	BLM
5MN478	Open site	Fair	L	0.5*	BLM
5MN479	Open site	Fair	L	0.5*	BLM
5MN480	Open site	Fair	L	0.5*	BLM
5MN576	Open site	Fair	S,L	0.5*	BLM
5MN577	Open site	Fair	L	0.5*	BLM
5MN578	Open site	Fair	L	0.5*	BLM
5MN579	Open site	Fair	L	0.5*	BLM
5MN580	Open site	Poor	L	0.5*	BLM
5MN581	Open site	Fair	L	0.5*	BLM
5MN582	Open site	Poor	L	0.5*	BLM
5MN583	Open site	Poor	L	0.5*	BLM
5MN584	Open site	Fair	L	0.5*	BLM
5MN585	Open site	Poor	S,L	0.5*	BLM
5MN586	Open site	Fair	L	0.5*	BLM
5MN587	Open site w/historic structure	Fair	L	0.5*	BLM
5MN588	Open site	Fair	L	0.5*	BLM

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
		University of Colorado Inventory (cont.)			
5MN589	Rockshelter	Fair	L	0.5*	BLM
5MN590	Petroglyph	Good	S,L	0.5*	BLM
5MN591	Rockshelter	Good	S,L	0.5*	BLM
5MN592	Open site	Fair	S,L	0.5*	BLM
5MN593	Open site	Poor	S,L	0.5*	BLM
5MN594	Stone alignment	Fair	L	0.5*	BLM
5MN595	Open site	Poor	S,L	0.5*	BLM
5MN596	Open site	Good	N,S,L	0.5*	BLM
5MN597	Open site	Poor	L	0.5*	BLM
5MN598	Open site	Poor	L	0.5*	BLM
5MN599	Open site	Fair	L	0.5*	BLM
5MN600	Open site	Poor	L	0.5*	BLM
5MN666	Open site	Fair	L	0.5*	BLM
5MN667	Open site	Good	S,L	0.5*	BLM
5MN668	Open site	Good	L	0.5*	BLM
5MN669	Open site	Fair	L	0.5*	BLM
5MN670	Open site	Fair	L	0.5*	BLM
5MN671	Open site	Fair	L	0.5*	BLM
5MN672	Open site	Fair	L	0.5*	BLM
5MN673	Open site	Fair	L	0.5*	BLM
5MN674	Open site	Poor	L	0.5*	BLM
5MN675	Open site	Poor	L	0.5*	BLM
5MN676	Open site	Poor	S,L	0.5*	BLM
5MN677	Open site	Fair	L	0.5*	BLM
5MN678	Open site	Fair	L	0.5*	BLM
5MN679	Open site	Fair	L	0.5*	BLM
5MN680	Open site	Fair	L	0.5*	BLM
5MN681	Open site	Fair	L	0.5*	BLM
5MN682	Brush enclosure	Poor/Fair	S,L	0.5*	BLM
5MN683	Open site	Fair	L	0.5*	BLM
5MN684	Open site	Fair	L	0.5*	BLM
5MN685	Open site	Fair	L	0.5*	BLM
5MN686	Open site	Fair	L	0.5*	BLM
5MN687	Open site	Fair	L	0.5*	BLM
5MN688	Open site	Fair	L	0.5*	BLM
5MN689	Open site	Poor	L	0.5*	BLM
5MN690	Open site	Fair	L	0.5*	BLM
5MN691	Open site	Fair	L	0.5*	BLM

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
		University of Colorado Inventory (cont.)			
5MN692	Open site	Fair	L	0.5*	BLM
5MN693	Historic corral	Fair	L	0.5*	BLM
5MN694	Open site	Poor	L	0.5*	BLM
5MN695	Open site	Poor	L	0.5*	BLM
5MN696	Open site	Poor	L	0.5*	BLM
5MN697	Historic drywall and fence	Poor	L	0.5*	BLM
5MN698	Open site	Fair	S,L	0.5*	BLM
5MN699	Open site	Poor	L	0.5*	BLM
5MN700	Open site	Poor	L	0.5*	BLM
5MN701	Open site	Fair	L	0.5*	BLM
5MN702	Open site	Poor	L	0.5*	BLM
5MN703	Stone circle	Fair	L	0.5*	BLM
5MN704	Stone circle	Fair	L	0.5*	BLM
5MN705	Stone circle	Fair	L	0.5*	BLM
5MN706	Stone circle	Fair	L	0.5*	BLM
5MN707	Stone circle	Fair	L	0.5*	BLM
5MN708	Stone circle	Fair	S,L	0.5*	BLM
5MN709	Open site	Fair	L	0.5*	BLM
5MN710	Open site	Fair	L	0.5*	BLM
5MN711	Open site	Poor	L	0.5*	BLM
5MN712	Open site	Poor	L	0.5*	BLM
5MN713	Open site	Fair	L	0.5*	BLM
5MN714	Open site	Fair	L	0.5*	BLM
5MN715	Open site	Fair	S,L	0.5*	BLM
5MN716	Open site	Fair	S,L	0.5*	BLM
5MN717	Open site	Poor/Fair	N,S,L	0.5*	BLM
5MN718	Open site	Fair	S,L	0.5*	BLM
5MN719	Open site	Poor	S,L	0.5*	BLM
5MN720	Open site	Poor	L	0.5*	BLM
5MN721	Open site	Fair	S,L	0.5*	BLM
5MN722	Open site	Fair	S,L	0.5*	BLM
5MN723	Open site	Fair	S,L	0.5*	BLM
5MN724	Open site	Fair	S,L	0.5*	BLM
5MN725	Open site	Fair	L	0.5*	BLM
5MN726	Open site	Good	N,S,L	0.5*	BLM

TABLE A-13
RECORDED ARCHEOLOGICAL
SITES (cont.)

Name and/or Number of Site	Site Type	Condition a/	Signif-icance b/	Physical Size (in acres)	Ownership or Status c/
		University of Colorado Inventory (cont.)			
5DT201	Stone circle	Good	L	0.5*	BLM
5DT202	Open site	Fair	L	0.5*	BLM
5DT203	Open site	Fair	L	0.5*	BLM
5DT204	Open site	Poor	L	0.5*	BLM
5DT205	Open site	Fair	L	0.5*	BLM
5DT206	Open site	Poor	L	0.5*	BLM
5DT207	Open site	Good/Excellent	L	0.5*	BLM
5DT208	Open site	Fair	L	0.5*	BLM
5DT209	Rockshelter	Poor	S,L	0.5*	BLM
5DT210	Rockshelter	Fair	S,L	0.5*	BLM
5DT211	Rockshelter	Poor/Fair	S,L	0.5*	BLM
5DT212	Rockshelter	Poor	L	0.5*	BLM
5DT213	Open site	Fair	L	0.5*	BLM
5DT214	Stone circle	Fair	L	0.5*	BLM
5DT215	Open site	Fair	S,L	0.5*	BLM
5DT216	Open site	Good	N,S,L	0.5*	BLM
5DT217	Rockshelter	Good	S,L	0.5*	BLM
5DT218	Open site	Fair	L	0.5*	BLM
5DT219	Open site	Fair	L	0.5*	BLM
5DT220	Historic habitation	Fair/Good	L	0.5*	BLM
50R86	Open site	Fair	L	0.5*	BLM
50R87	Open site	Poor	L	0.5*	BLM
50R88	Open site	Poor	L	0.5*	BLM

APPENDIX 7

HISTORIC SITES IN THE ES AREA

TABLE A-14
HISTORIC SITES

Name of Site	Site Number	Principal Feature	Integrity a/	Condition b/	Signifi-cance c/	Size (in ac.)	Ownership/ Management d/
Gypsum Mine	GG-001	Mine	Fair	Fair	L	5.0	BLM
Uranium Mines	GG-002	Mines	Fair	Poor	L	10.0	BLM
Mine Adit	GG-003	Adit	Fair	Fair	L	1.0	BLM
Ute Trail	GG-004	Trail	Good	Good	L	1.0	BLM
Howell's Village	GG-005	Townsite	Good	Fair	L	5.0	BLM
Ute Trail Cabin	GG-006	Cabin	Poor	Poor	L	0.05	BLM
Lime Kiln	GG-007	Kiln	Fair	Fair	L	5.0	PVT/BLM adj.
Duncan Cabin	GG-008	Cabin	Fair	Poor	L	1.0	BLM
Cabin/Forage	GG-009	Cabin	Poor	Poor	L	1.0	BLM
Cabin Foundation	GG-010	Foundation	Poor	Poor	L	1.0	BLM
Red Canyon Cabin	GG-011	Cabin	Fair	Fair	L	5.0	BLM
Cabin	GG-012	Cabin	Fair	Poor	L	0.05	BLM
Cabin	GG-013	Cabin	Fair	Poor	L	0.05	BLM
D&RGW Rail Line	UG-001	Railbed	Fair/Poor	Fair/Poor	L, S	5.0	BLM
Cedar Hill Cemetery	UG-002	Cemetery	Good	Good	L	10.0	PVT/BLM adj.
Shin Park Foundation	UG-003	Foundation	Poor	Poor	L	1.0	BLM
Canal	UG-004	Canal	Poor	Poor	L	9.8	BLM
Dumpsite	UG-005	Dump	Poor	Poor	L	1.0	BLM
D&RGW Railgrade	UG-006	Railbed	Poor	Poor	L, S	12.2	BLM
Potato Shed	UG-007	Shed	Good	Good	L	1.0	PVT/BLM adj.
Cabin	UG-008	Cabin	Good	Good	L	2.0	PVT/BLM adj.
Homestead (Olathe)	UG-009	Cabin	Good	Good	L	1.0	PVT/BLM adj.
Selig Canal	UG-010	Canal	Poor	Poor	L	2.0	BLM
Cabin	UG-011	Cabin	Fair	Fair	L	1.0	PVT/BLM adj.
Grave	UG-012	Gravesite	Poor	Poor	L	0.05	BLM
Dominguez Bridge	UG-013	Bridge	Good	Good	L	0.05	BLM

a/ "Integrity" refers to the historical condition of a site--its past and present conditions and present setting. A site with "good" integrity would appear virtually as it was when it was built, while a site with "poor" integrity would be either totally obliterated or so substantially modified that it would no longer be recognizable.

b/ "Condition" refers to the present physical condition of a historical site--the condition of the structure(s) or area of the site (including any evidence of vandalism), the condition of architecture, and the condition of the land around the site. A site in "good" condition would have a building with excellent structural quality, the land around it would be nearly like the original, and there would be no signs of vandalism. A site in "poor" condition would show signs of decay, the land might be modified, and there might be signs of human or animal intrusion.

c/ N = national; S = state; L = local.

d/ BLM = Bureau of Land Management; PVT = private; Colo = State of Colorado; BR = Bureau of Reclamation

TABLE A-14
HISTORIC SITES (cont.)

Name of Site	Site Number	Principal Feature	Integrity a/	Condition b/	Signifi-cance c/	Size (in ac.)	Ownership/ Management d/
D&RGW Rail Line	UG-014	Railbed	Good	Good	L, S	26.84	BLM
Escalante Cabin	UG-015	Cabin	Fair	Fair	L	1.0	PVT/BLM adj.
Captain Smith House	UG-016	Cabin	Fair	Good (restored)	L	2.0	Colo/BLM adj.
Cabin	UG-017	Cabin	Fair	Fair	L	1.0	PVT/BLM adj.
Homestead	UG-018	Homestead Site	Good	Fair	L	5.0	PVT/BLM adj.
Foundation	UG-019	Foundation	Fair/Poor	Fair	L	0.75	PVT/BLM adj.
Barn	UG-020	Barn & Shed	Fair/Poor	Poor	L	2.0	BR/BLM adj.
Hansen Mansion	UG-021	Home	Good	Good	L	5.0	PVT/BLM adj.
Building	UG-022	Stone Building	Fair	Poor	L	2.0	PVT/BLM adj.
Pumphouse	UG-023	Delta Pumphouse	Good	Fair	L	2.0	BLM
Mill	UG-024	Millsite	Poor	Poor	L	5.0	PVT/BLM adj.

APPENDIX 8

METHODOLOGY FOR DETERMINING VISUAL RESOURCE MANAGEMENT CLASSES, VISUAL IMPACTS, AND IMPACT MITIGATION

DETERMINATION OF VISUAL RESOURCE MANAGEMENT (VRM) CLASSES

VRM classes comprise scenery quality, visual sensitivity levels, and distance zones.

Scenery quality is determined from a quantified scenic evaluation process. Three quality ratings result: outstanding (A), characteristic (B), and minimal (C).

Visual sensitivity levels are an index of the relative importance or value of visual response to an area. Commonly considered criteria are:

1. Traffic counts for highways and roads;
2. Recreation uses of public land types, use counts, local, regional, national significance;
3. Community attitudes;
4. Land use relationships.

Distance zones are important because, in most cases, the closer viewers are to an object, the more contrast or detail they see. The distance zones are:

1. Foreground: from 0 mile to 0.5-1 mile;
2. Middleground: from 0.5-1 mile to 3-5 miles;
3. Background: from 3-5 miles to 15 miles;
4. Seldom seen: beyond 15 miles or in closer areas which are screened by landform or vegetation from the common viewing points. After the above VRM class combinations are determined, they are then compared with a chart (figure A-11) to determine the VRM classes.

DETERMINATION OF VISUAL IMPACT

Whether or not a proposed project would create a visual impact is determined through the use of a contrast rating. Each type of proposed project is quantitatively analyzed to determine (predict) what contrast each would create in the foreground, middleground, and background distance zones, i.e., what deviations from the form, line, color, and texture of the surface and vegetation caused by the addition of structures or alterations to the existing landscapes. Initially, this analysis is not site specific but assumes optimum viewing conditions. The contrast ratings (numerical scores) are then compared with the numerical limits for each VRM class. Contrast ratings greater than the limits for the VRM classes create discordant deviations and are considered to be visual impacts. Those contrast ratings within the limits of the VRM classes create harmonious deviations and are not considered to be visual impacts. Table 3-15 Visual Impact Summary (see chapter 3), displays the results of this step of the analysis. The next step carries the analysis to the site specific or project level. Every proposed project is examined to see in which VRM class area it lies and is analyzed for design and visibility characteristics which may increase or decrease the contrast rating and consequently visual impact.

IMPACT MITIGATION

Mitigation of visual impacts involves implementation of design measures to reduce the contrast changes to landform and vegetation caused by the addition of structures or alterations to the existing environment, to bring the numerical scores for contrasts within or as close as possible to the limits for the VRM class.

	VISUAL SENSITIVITY LEVEL 2/						
	HIGH			MEDIUM			LOW
SPECIAL AREAS	I	I	I	I	I	I	I
SCENERY CLASS 1/ A	II	II	II	II	II	II	II
SCENERY CLASS 1/ B	II	III	IV	III	IV	IV	IV
SCENERY CLASS 1/ C	III	IV	IV	IV	IV	IV	IV
	FG	BG	SS	FG	BG	SS	SS
	VISUAL ZONES 3/						

1/ SCENERY QUALITY INVENTORY — A, B, C

2/ VISUAL SENSITIVITY LEVEL — High, Medium, Low

3/ VISUAL ZONES — FG - Foreground-Middleground; BG - Background; SS - Seldom Seen

Note: Class I applies only to classified special areas, e.g., wilderness, primitive, natural areas, etc. The quality standard is established through legislation or policy.

Figure A-11. Chart for determining VRM classes

APPENDIX 9

PRIMITIVE AREA MANAGEMENT POLICY AS SET FORTH IN THE COLORADO SUPPLEMENT TO BLM MANUAL 6621

K. GRAZING.

Grazing of domestic livestock may be permitted by the authorized officer under such conditions and restrictions as he deems necessary to preserve primitive values.

1. A grazing management system should be developed to minimize the impact of grazing on natural processes. Minimization of changes in plant composition and water quality should be considered in development of the grazing program. A program to monitor the impact of a grazing management system is essential to assess achievement of the objectives of preserving primitive values.

2. Permanent facilities and developments associated with grazing activities are permitted only where minimal developments (like spring development) will promote grazing activities which reduce unacceptable ecological impacts.

APPENDIX 10

METHODOLOGY FOR ESTIMATING SPORTSMEN EXPENDITURE CHANGES RESULTING FROM CHANGES IN WILDLIFE POPULATIONS

Three big game species are considered: elk, deer, and antelope. For deer and elk, expenditure changes are based on sportsmen expenditures per animal in the herd for Colorado's Planning Region 10 during 1973. For antelope, expenditure changes are based on the number of permits being made available based on herd increases. It is assumed that the current trend of about one additional permit issued per ten animals will apply in this case.

Data used are 1973 Colorado Big Game Harvest, Department of Natural Resources, Division of Wildlife (DOW); southwest Colorado DOW multipliers for determining herd populations from harvest data as detailed in appendix 5 (Methodology for Deriving Big Game Populations); and sportsmen expenditures in Colorado from A Survey of Sportsmen Expenditures for Hunting and Fishing in Colorado, 1973, prepared jointly by DOW and the Department of Economics of Colorado State University.

The Region 10 population estimates for deer and elk were obtained by using DOW county harvest data, adjusting those data for types of hunts held in the relevant hunting units, and applying the appropriate DOW southwest Colorado multiplier formulas. The population estimates were then used to develop an expenditure index per animal. (See table A-15.)

Deer

1. 1973 sportsmen expenditures in Region 10 for deer related activities totaled $6,028,320.
2. 1973 estimated Region 10 deer population was 65,648.
3. 1973 sportsmen expenditures in Region 10 per animal totaled $91.83 ($6,028,320 ÷ 65,648 = $91.83).

Elk

1. 1973 sportsmen expenditures in Region 10 for elk related activities totaled $4,484,201.
2. 1973 estimated Region 10 elk population was 23,723.
3. 1973 sportsmen expenditures in Region 10 per animal totaled $189.02 ($4,484,201 ÷ 23,723 = $189.02).

Antelope

1. 1973 sportsmen expenditures in Region 10 for antelope related activities totaled $8,305.
2. 1973 Region 10 antelope hunting permits issued totaled 30.
3. 1973 sportsmen expenditures per permit issued totaled $276.83 ($8,305 ÷ 30 = $276.83).

Elk

1. 1973 sportsmen expenditures in Region 10 for elk related activities totaled $4,484,201.

2. 1973 estimated Region 10 elk population was 23,723.

3. 1973 sportsmen expenditures in Region 10 per animal totaled $189.02 ($4,484,201 23,723 = $189.02).

Antelope

1. 1973 sportsmen expenditures in Region 10 for antelope related activities totaled $8,305.

2. 1973 Region 10 antelope hunting permits issued totaled 30.

3. 1973 sportsmen expenditures per permit issued totaled $276.83 ($8,305 30 = $276.83).

TABLE A-15
SPORTSMEN EXPENDITURE CHANGES EXPECTED FROM
BIG GAME POPULATION CHANGES (1973 DOLLARS) FOR THE ES AREA

Species	Expenditure per Animal	Change in Herd Population		Change in Sportsmen Expenditures	
		Low Est.	High Est.	Low Est.	High Est.
Deer	$ 91.83	2,200	4,500	$202,026	$413,235
Elk	189.02	96	156	18,146	29,487
Antelope	276.83 (per permit)	53 (6 permits)	73 (8 permits)	1,661	2,215
Total (Primary Proposal)				$221,832	$444,937

Note: Since sportsmen expenditures are dependent on big game herd populations, expenditure changes are assumed to occur on the basis of population changes and tied to these 1973 data for the purpose of determining an index for calculation of expenditure changes.

APPENDIX 11

SAMPLE ALLOTMENT MANAGEMENT PLAN AGREEMENT BETWEEN DISTRICT MANAGER AND LIVESTOCK PERMITTEE

Summary and Agreement to the Plan

A. We, the undersigned users of the Federal Range in Colorado Grazing District Number 3, hereby agree to and accept this allotment management plan.

B. We understand that the grazing privileges so authorized herein are subject to all provisions of the Federal Range Code for Grazing Districts and all subsequent amendments thereto.

C. It is understood and agreed that, should periods of range depletion occur due to prolonged drought, fire or other natural causes, or should habitat requirements of threatened/endangered flora and fauna so warrant adjustment, reduction in number of livestock or adjustment in periods of range use may be directed by the District Manager or his authorized representative.

D. The range users will cooperate with the District Manager or his authorized representative in the studies as outlined.

E. The range user(s) and BLM will perform construction and maintenance as outlined.

F. Revisions in this plan may be made by the concurrence of the operator and District Manager, as indicated by initialing, dating, and numbering of the page containing revisions.

APPENDIX 12

SCHEMATIC DIAGRAMS OF GRAZING SYSTEMS

Note: The treatments are defined and discussed in chapter 1 under Components. The dates below are average; a date may vary as much as one or more months either way.

Typical Rest Rotation - Two Treatments (fall or winter grazing)

TREATMENT	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT 15	NOV	DEC	JAN 31	FEB
D or C								▨	▨	▨	▨	
E					rest year long							

Pastures

Years	1	2
1st	D or C	E
2nd	E	D or C
3rd (repeat cycle)		

Typical Rest Rotation - Two Treatments (spring grazing)

TREATMENT	MAR	APR	MAY 1 25	JUL	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
A			▨									
E					rest year long							

Pastures

Years	1	2
1st	A	E
2nd	E	A
3rd (repeat cycle)		

Typical Rest Rotation - Three Treatments

TREATMENT	MAR	APR	MAY 16	JUN 15	JUL	AUG	SEP	OCT 16	NOV 31	DEC	JAN	FEB
A			▨	▨								
C or D								▨	▨			
E					rest year long							

Pastures

Years	1	2	3
1st	A	C or D	E
2nd	C or D	E	A
3rd	E	A	C or D
4th (repeat cycle)			

Legend: ▨ Graze ☐ Rest

Typical Rest Rotation - Four Treatments

TREATMENT	MAR	APR	MAY 16	JUN	JUL 14	AUG	SEP 15	OCT 31	NOV	DEC	JAN	FEB
A			▨	▨	▨							
B					▨	▨	▨					
C							▨	▨				
E			YEAR	LONG		REST						

Years	Pastures 1	2	3	4
1st	A	B	C	E
2nd	B	C	E	A
3rd	C	E	A	B
4th	E	A	B	C
5th (repeat cycle)				

Typical Rest Rotation - Four Treatments

TREATMENT	MAR	APR	MAY 31	JUN	JUL	AUG	SEP	OCT	NOV 30	DEC	JAN	FEB
A			▨									
C OR D								▨	▨			
E			YEAR	LONG		REST						
C OR D								▨	▨			

Years	Pastures 1	2	3	4
1st	A	C or D	E	D
2nd	C or D	E	D	A
3rd	E	D	A	C or D
4th	D	A	C or D	E
5th (repeat cycle)				

LEGEND: ▨ GRAZE ☐ REST

Typical Rest Rotation - Five Treatments

TREATMENT	MAR	APR	MAY	JUN 1	JUL 20	AUG	SEP 10	OCT 31	NOV	DEC	JAN	FEB
A				▨	▨							
B					▨	▨	▨					
C							▨	▨				
E			year	long	rest							
B					▨	▨	▨					

Pastures

Years	1	2	3	4	5
1st	A	B	C	E	B
2nd	B	C	E	B	A
3rd	C	E	B	A	B
4th	E	B	A	B	C
5th	B	A	B	C	E
6th (repeat cycle)					

Typical Deferred Rotation

TREATMENT	MAR	APR	MAY 15	JUN 15	JUL	AUG	SEP	OCT 1 31	NOV	DEC	JAN	FEB
Graze in spring for livestock production			▨	▨								
Defer grazing until after seed ripe(or return from USFS)								▨				

Pastures

Years	1	2
1st	Spring	Defer
2nd	Defer	Spring
3rd (repeat cycle)		

Typical Deferred Grazing

TREATMENT	MAR	APR	MAY	JUN	JUL seed ripe	AUG	SEP 15	OCT	NOV	DEC	JAN 15	FEB
Graze after seed ripe occurs							▨	▨	▨	▨	▨	

LEGEND: ▨ Graze ☐ Rest

APPENDIX 13

ACTUAL COMMENT LETTERS

Department of Range Science

CSU

Colorado State University
Fort Collins, Colorado
80523

1

October 4, 1977

Mr. Dale Andrus
State Director, BLM
Room 700, Colorado State Bank Bldg.
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus:

Enclosed you will find my comments on the Uncompahgre impact statement.

Sincerely yours,

C. Wayne Cook
Department Head

CWC:cc

Enc.

COMMENTS ON THE UNCOMPARHGRE BASIN RESOURCE
AREA GRAZING ENVIRONMENTAL STATEMENT
by
C. WAYNE COOK

Page 3-13

I challenge the formulae on page 3-13 which shows that fair condition range or medium grazing give identical infiltration or run-off patterns. Furthermore they only account for 63% of the variation in Y so the entire calculation is not a good estimate of infiltration rate. Besides it would depend upon soil texture degree of slope both of which have not been considered. Why does BLM fall for such ridiculous models that have no application to the problem at hand. The same is true for infiltration rate for poor range condition or heavy grazing. Certainly the cover and surface soil condition are not the same for heavy grazing in one case and poor condition range in another. Such a presentation detracts from the overall integrity of the report.

Why does not BLM carry out some infiltration studies that evaluate soil texture, degree of slope, intensity of grazing and condition of the range on the Uncompahgre if they really want to know. Dr. Gobel's thesis at Utah State certainly would not agree with your statements on grazing intensely and range condition.

I suspect you are calling letterman's needle grass green needle grass. I do not think appreciable amounts of green needle grass would appear in this area.

Page 3-48

Spring grazing of 30% utilization does not harm desert ranges and grazing foothills and mountain brush ranges at 40 to 50 percent does not cause lowered plant vigor or cause range deterioration. Cook (1971) and Cook (1966) Development and use of Spring Ranges in Utah (Bulletin 461) and annual reports at San Juan Basin on Mountain Brush range do not agree with your statements on use and range deterioration. If the seasons are rotated among years twice this use can be made without damage to the range.

Page 3-58

The statement under mule deer about the deer searching for new shoots exhausts their energy and they abort the foetus is without foundation. There is no data to substantiate that animals searching for green shoots abort their young for either domestic or wild animals. The U.S. Department of Interior (1974) reference does not present data that support such contention but merely presuppose that such takes place.

Page 3-60

All of us have seen elk in meadows where cattle not only have grazed but are currently grazing. I personally have counted 70 head of elk in meadows that I have sprayed and fertilized where cattle have grazed but were moved out the same season.

Page 3-16

There is no data showing that if 1800 pounds of plant biomass is produced and 600 pounds is removed by livestock that small animal populations are reduced. In fact there are more studies showing that rabbits are more abundant on over grazed ranges than on ungrazed ranges. You must be comparing a barren waste to ungrazed range which is again unreasonable. It seems the BLM insists upon making supposition that a bit of plant biomass removed is harmful to deer, elk and small animal habitat which is certainly not true and should not be inferred.

Studies on the IBP site at Ft. Collins certainly do not show that prairie dogs are any more sparce on heavily grazed ranges than they are on ungrazed ranges. In fact use by one herbivore often makes it more appropriate to another herbivore. In fact in this report it should be inferred that livestock may produce a subclimax which supports greater big game populations.

Page 3-64

For the love of God who wrote this statement "Grazing these plants (riparian) in fall and winter after their food reserves are stored and during their dormant period can limit the ability of the plant to regrow the following spring." This is least harmful and can be condusive to more vigorous growth by a pruning effect. Certainly this is the period that plants can withstand greatest defoliation even as high as 70% without harm. Hormay (1970) does not confirm such a statement and neither does Cook (1971). Why lower the quality of a potentially good report by letting some uninformed wildlife biologist make such ridiculous statements.

Page 3-74
It is inferred that cattle feces in the streams would reduce fish population. On the contrary it would fertilize the stream and provide more food for fish.

It seems this report, in many respects, is like the Nevada report and the Challis statement. Namely because people have assumed that any type of grazing conflicts with wildlife, riparian vegetation, caves off stream banks, reduces herbage for small animals as well as large animals, causes soil compaction, decreases infiltration and increases sediment yield. They don't really know why but feces in streams appears to be detrimental to fish populations. These comments are preconceived ideas but they are not really present on all grazing allotments. In fact they are of some consequence or concern only when improper management is allowed to take place. Therefore, we are assuming that livestock cannot be managed properly and consequently all of the adverse effects associated with improper grazing of livestock will take place.

This type of thinking was prevalent in chapter 3 and is carried through in somewhat the same vain in other chapters.

I would assume that by the time 112 EIS's are written that report that grazing is detrimental to aesthetics, recreation, wildlife and fish habitat along with causing air and water pollution through soil compaction, decreased infiltration and increased erosion by wind and water erosion will eventually elimate livestock grazing from federal lands which is rather

obvious was the purpose of the EIS's at the onset of their iniation. When the public (the true people) get hungry and want meat at a reasonable cost then I assume there will be a turn around but until then it seems we are to follow the dictates of the socialistic environmentalist.

Why is it not necessary to confirm that the soil is indeed compacted on the area in question by a through study if it is considered serious? Why is not the true conflict of big game and livestock grazing evaluated on the area by factual data? Why is not the true data on destruction of riparian vegetation by livestock if indeed it does exist on the area rather than quoting distant and remote research stating it has been found to happen in Nevada or elsewhere?

Unavoidable Adverse Impacts Chapter 5
Page 5-3
Wildlife forage would be reduced around watering troughs because of livestock concentration. Why just around water holes? Chapter 3 infers that this would happen all over the range.

Riparian vegetation.
It would seem that wildlife eat as much or more riparian vegetation than cattle so why is all the blame placed upon cattle?

Why does cattle grazing destroy archeological areas? This sounds as though cattle are being blamed for what people would do since cattle don't dig holes in the ground.

Chapter 8 page 8-31
Why quote McLean and Tisdale who did their work in Canada and thus would be a far fetched comparison to the Uncompahgre area concerning vegetation recovery.

Chapter 8 and Chapter 3 contradict themselves in many respects. Chapter 8 states that grazing by livestock can sometimes be beneficial but Chapter 3 paints out all of the adverse effects of livestock grazing without qualification.

Page 8-32 and 8-33
Have studies really been made to determine the extent of the riparian habitat deterioration and if so was it determined that it was all due to livestock grazing?

Have you data to show the extent of stream bank caving in or off by livestock as inferred in Chapters 8 and 3.

Chapter 3 states that grazing is more or less universally bad for everything and Chapter 8 almost confirms that everything would be better off without grazing. In any event only about 2.3 percent of the total cattle numbers of the area would be lost and only 11 operators out of 14.6 would perhaps go out of business if all grazing was eliminated. I believe this is an unreasonable simplification of the impacts upon the livestock industry of the Uncompahgre area. I am sure the livestock people could tell you another story but unfortunately they don't have the time or money to make a study.

Appendices A-28
Why is 1963 range survey data used for condition and trend analysis? Why not 1975 or later analysis that would be more meaningful?

Somehow I feel this report is being written to satisfy the whims of the NRDC and the Federal Wildlife Feredation since it is based largely upon supposition and not measured parameters to show the true impacts of present management systems on those that would occur with the several alternatives.

CITY OF MONTROSE

433 SOUTH FIRST STREET
MONTROSE, COLORADO 81401
TELEPHONE 303-249-4534

(2)

November 1, 1977

Mr. Marlin Jones
District Manager
Bureau of Land Management
Highway 550 South
Montrose, Colorado, 81401

Dear Marlin:

Here is my statement on the Grazing E. S. I am sorry that I could not deliver it in person, but I had to attend an Energy Conference in Denver. I hope that the statement is detailed and factual enough to have some impact on C.E.Q.'s decision. This is my opinion and not necessarily indicative of the opinion of the City.

If I can be of any help, please call me.

Sincerely,

Mike Serra
Energy Impact Co-Ordinator

MS:sg

COMMENTS ON

GRAZING ENVIRONMENTAL STATEMENT

The Uncompahgre Basin Resource Area Grazing Environmental Statement deals with B.L.M's proposal to manage grazing on Federal resource lands and the potential environmental impacts of their management program. Let us deal firstly with the management program devised by B.L.M. and then with the impacts of the program and finally with the program alternatives.

The management program is based on Allotment Management Plans (A.M.P.s) with their long term objectives being with the improvement of grazing management and an animal unit month (AUM) increase of 12,645 units by the year 2006 with minimal effect to the environment. The increase is necessary for a variety of reasons, some of which are:

1) Insuring that red meat production can meet future demands.

2) The reduction of erosion

3) Sustaining forage yield for wildlife

4) Maintenance or improvement of riparian habitats.

Grazing in the Uncompahgre Valley did not spring up overnight and neither did the A.M.P. program. Grazing began in the Valley nearly 100 years ago and is still in full swing. Around 1950 some progressive persons looked around them and saw that perhaps the range was not being used to its best advantage and they proceeded to perform stocking rate studies on the range. This practice was continued until 1968.

In 1976 B.L.M. decided to improve on the stocking rate studies and conducted a series of unit resource analysis (U.R.A.) investigations in the E.S. area. Via these data gathering studies, Management Framework Plans (M.F.P.s) were formulated. The analysis of which lead to the formulation of the A.M.P. programs. Benefit cost analyses of the A.M.P.s soon followed.

B.L.M. defines an A.M.P. as "a livestock grazing plan which provides specific management programs for an allotment based on an analysis of the renewable resource values and potential uses of that allotment." The A.M.P. goes much farther in that it gives the District Manager the ability to adjust range use to meet any existing range condition. In this flexibility lies the A.M.P.s strength.

The flexibility promotes the multiple use concept of renewable resources on National Resource Lands by considering potentially concurrent developments of wildlife, watershed, livestock, vegetation, esthetics, timber, recreation, minerals, etc. dependent upon current range conditions and priorities in each allotment. This is shown by the systematic livestock grazing approach described in the E.S.

The systematic approach allows for several management plans including rest rotation, deferred rotation, deferred grazing, trailing, etc., to be performed on the allotments as needed. Further, improvements to the range such as fences, wells, catchment basins, boundary markers and spring improvements attest to the A.M.P.'s concern for livestock, wildlife and range. An example of the plan improvments for water include ramps in water troughs not only to supply water for drinking but also as a means of egress should an animal fall into a trough

by accident. Fence posts and cattle guards painted to blend in with their surroundings also attest to B.L.M.s concern for for both grazing and the environment.

There are many more examples in the E.S. of how the B.L.M. is trying to promote the multiple use concept in its grazing program with minimal environmental impact. Let us now see what impacts the A.M.P. program will have on the environment regardless of B.L.M.'s efforts.

As one reads the Environmental Statement looking for impacts, he first encounters a lengthy section with many extensive graphs and tables describing the existing environment. It is a necessary section to establish baseline data, but one soon begins to skim through it in search of more "meaty" text. The fast ends at Page 2-102 and the repast continues until the reader, now glutted with endless comparisons, gazes upon the most beautiful word in the English language - Appendicies.

Despite the length of the impact section, it is beneficial to compare the future environment without the proposal to the environment with the proposal.

Aspect	Without Proposal	With Proposal
Soils	Not changed drastically	Nothing
Water	Vary with change	Net decrease in runoff with salinity decrease but not truly significant
Veg.	Amt. of veg. decrease by approx. 2%	Expect increased veg. in long run with A.U.M. up from 51,315 to 63,960

Aspect	Without Proposal	With proposal
Wildlife	Major species not sig. dif. but infringement by man may endanger less adaptable species	Long term - deer up, Elk up, others up; less infringement to endanger species less tolerant to man
Aquatic	Overall decline of 44.1 miles of riparian habitat	Net improvement of 28.1 miles of riparian habitat
Cultural	Doubtful if any additional monies or staff can stop loss of these sites	Disturbance or destruction of various cultural and historic sites
Visual	Very little	Very little
Recreation:	Dallas Dam will increase recreation	Dallas Dam increase while A.M.P. will have minimal effect
Ag.	No sizable for non-grazing No sizable change in # of cattle but range may decline	Increase grazing forage
Scio-Economic	Very little affected by grazing considerations	Well being of valley slightly improved

From the above brief analysis, one can see that the A.M.P. program will not work wonders, but it will be slightly beneficial in some areas and significantly helpful in areas such as aquatic or riparian habitat, wildlife as to major species (deer, elk, antelope), vegetation and the grazing portion of the agricultural section. At this point we should examine some of the other B.L.M. alternatives as well as the remaining chapters in the E.S.

Alternative A: Continue current grazing program - this section is nearly totally redundant of Section 2-102 through 2-122.

Alternative B: Eliminate grazing - violates the concept of

multiple use and lowers the economic viability of the valley while not significantly enhancing the quality of the environment.

Alternative C: Custodial Management of Grazing - this alternative is slightly less economically acceptable than the A.M.P. proposal and not significantly different than the A.M.P. proposal environmentally.

Alternative D: Reduced grazing - this alternative violates the multiple use concept without any significant gain in environmental quality.

Alternative E: Elimination of Grazing on allotments with soils in severe and critical erosion classes - the section is redundant as it is not significantly different than the systematic elimination of grazing on the same type of soil conditions called for in the A.M.P. proposal.

Other Chapter s:

1) Mitigating Measures - The Chapter indicates to what extent B.L.M. has bent over backward to protect the environment. E.G., they propose to fence off two endangered cactus species. Those are Echinocereus triglochidiatus var. inermis and Sclerocatus glaucus.

2) Adverse effects which can't be avoided - Chapter illustrates the incredible detail that B.L.M. put into the E.S. but is not entirely necessary as the adverse effects are easily outweighed by the advantages of the A.M.P. (Redundant).

3) (Relationships between local short term uses of the human environment and maintenance and enhancement of the long

term productivity - This section is redundant and was covered adequately in the previous chapters.

4) Irreversible and irretrievable commitments of Resourses - The chapter is redundant and is merely a quantification of items mentioned in earlier chapters.

5) Consultant and Co-ordination - This section could have been placed in an appendix but does show the extent to which B.L.M. sought input and co-ordination among all the peoples and entities involved in the E.S.

While the A.M.P. proposed is an excellent, well-designed management plan, the E.S. is not the document it could be. It is overly long and redundant in many places. The author seemed to change the titles of the alternatives and rearrange the text simply to generate a generous selection of alternatives. Once through the discussion would have been quite sufficient. The length however, is not B.L.M.'s fault. Remember! The National Resources Defense Council brought suit against B.L.M. because their programatic E.S. violated the National Environmental Protection Act. The result of the suit was a mandate requiring B.L.M. to prepare 212 site specific Environmental Statements over the entire United States at a cost of between Five Hundred Thousand and One Million Dollars per copy. Even after the E.S.s are prepared there is no assurance that they will be acceptable to the National Resources Defense Council. This is the reason for the incredible detail in the Environmental Statement. It is just too costly to afford to leave out one species or to paint a fence post the wrong color and have the E.S. reject~~ed~~. It is quite apparent to me that the interpretation of the

National Environmental Protection Act is totally out of hand. Especially when considering that rejection of this Environmental Statement could put a halt to grazing in the same fashion that a National Resources Defense Council suit has effectively brought coal leasing to a halt. This trend is especially appalling when two laws, the 1934 Taylor Grazing Act and the 1964 Classification and Multiple Use Act both allow for the disposal or retention of National Resource lands for management under the principles of multiple use.

The time has come when we must realize that there are two inter-related yet different environments to protect - the physical-esthetic environment and the socio-economic environment. B.L.M.'s proposed A.M.P. program can protect both.

All "new dollars" come from the earth and the range is one of the few renewable resources from which these dollars can arise. Through the multiple use concept implemented by B.L.M.'s A.M.P. program both the socio-economic and physical environment can be protected in such a fashion to preserve a valuable renewable resource and ensure the economic strength of the Uncompahgre Valley.

(3)

M. S. Wilson
Rt. 1 Box 126F
Cedaredge, Colo.
81413

Oct. 29, 1977

Re: 1792
(111)

United States Department of the
Interior
Bureau of Land Management
District Office
P.O. Box 1269
Montrose, Colo. 81401

Gentlemen:

I have reviewed the Uncompagre Basin Resource Area Grazing DES Statement.

I offer the following suggestions for your consideration:

Page 1-40: Typical Water Tank. I suggest the inlet fill pipe be brought upward outside of the tank, in lieu of inside the tank, and enter through the side of the tank above the water line. Provide drain cock or valve at heel of riser pipe for line drainage and freeze protection. Also provide water outlets on side of tank 6" above bottom of tank and again near top of tank at high water line for overflow relief.

Provide gate valve on bottom outlet and extend pipe as may be required and connect overflow outlet piping to outlet pipe beyond gate valve discharge.

Each tank penetrations should be made with galvanized tank nipple, two lock nuts and two asbestos composition ring gaskets. Gate valves should be Nibco Resilient Seal "U" valves for minimum maintenance.

All fittings should be galvanized malleable iron, nipples galvanized steel, Schedule 40.

The disadvantages of having the fill pipe enter the tank through the concrete floor are:

1. Leaks at point of entry are difficult to detect and repair.
2. Such leaks could cause settling of soil under the concrete slab. The result could be two fold, loss of water and excessive cost of repair or replacement of concrete slab.

All other portions of the DES appear to be very complete, informative and well prepared. However there appears to be an overuse of abreviations such as DOW, AUM NRL, etc. I suggest one explanation per page as used.

I am a member of the Region 10, Overall Economic Development Program. (Delta Surface Creek Area) I therefor wish to express my appreciation to BLM for allowing me to review this statement.

I consider this statement as a valuable source of reference data that will help OEDP to better understand our mutual problems in this area.

While my input to BLM has been very limited, I appreciate the opportunity to become better acquainted with enviormental and energy problems in this area.

I therefor would appreciate remaining on your mailing list.

Sincerely yours,

M. S. Wilson

(4)

STATEMENT OF

UNCOMPAHGRE LIVESTOCK ASSN.

We, as the Uncompahgre Livestock Association, go on record supporting the statement of Lawrence Phelps on the Uncompahgre Basin Resource Area, and support the changes recommended therein.

Also, to emphasize the fire hazard there is to dead grass that will accumulate over the summer where there is no grazing.

And, if grazing is abolished the tax base of the county will be seriously affected. We feel that the grazing industry should be given the equal consideration as other interests in the multiple use concept.

Uncompahgre Livestock Association

President

(5)

Billingsley Ranch

on the San Miguel

P. O. Box 296 – Nucla, Colorado 81424
Phone – 864-7394

RECEIVED
NOV 8 '77
BLM, Montrose

Ms. Marlyn V. Jones
District Manager - B.L.M.
Dear Sir:

RE: Uncompahgre Basin Resource Area Grazing Environmental Statement.

I am a permittee on B.L.M. lands. I am also president of the West End Livestock Association.

I concur with the statement Mr. Lawrence Phelps presented at the hearing, on Nov. 1, 1977.

Thank you.

Carl L. Billingsley

Audubon Society of

Western Colorado, Inc.

P.O. Box 1211
Grand Junction, Colorado 81501

(6)

Nov 4, 1977

Bureau of Land Management
Hwy 550
Montrose, Colorado 81401

Dear Sir:

I wish to comment on the Uncompadre Basin R. A. grazing E. S.

First I could find no proposal for a funded monitoring system to measure the effects of the plan on the range for cattle and sheep and a complete range of wildlife species. Any plan with out a system of monitoring so that the plan can fit changing conditions is bound to be falty.

We have grave concerns about the proposed chainnings. We do not feel that chainnings have been adequitly studied in the past to asses impacts. Many chainnings have not resulted in a good stand of forage grasses. I run a U.S.F.&W. breeding bird survey south of Delta and I have noted that bird populations in the chained areas are much smaller than in ajoining areas of pinyon-juniper and that the variety is also greatly reduced. It also appears that the proposed chainings are on hotter and dryer sites than earlier chainings and are even less likely to be successful.

The plan seems also to have a number of inconsistant statements as the fallowing ones in the summary:
Paragraphs 1& 2
1. vegetation would improve in quantity and quality;"
2. reduced vegetative vigor and reproduction do to spring and summer grazing.

Comment- Do they mean that in the short term they will increase the intensity of the spring and summer grazing? or that spring and summer grazing will be discontinued? or that some range will be sacrificed (temporarily) in order to improve others? In sentence #2 they used the word short term- I don't believe that you mean by that the grazing year or just one grazing cycle.

1. "Resulting in population increases(of terrestrial wildlife)."
2. " " increased Wildlife -livestock competition on crucial winter ranges."

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Comment: Is wald referring to deer only? How can you increase the deer population by reducing the amount of critical winter range? it sound like you will be improving the range by reducing spring and summer vigor.

Recreation does not seem to be taken very seriously, How can any damage to cultural sites be negligible are are you serious about measures for mitigation.

Sincerely,

David Galinat
president

(7)

WILDERNESS WORKSHOP of cosc

District Manager
Montrose District Office
Bureau of Land Management

November 7,1977

Dear Sir:

Thank-you for sending a copy of the Draft Environmental Impact Statement for the proposed livestock grazing program for the Uncompahgre Basin Resourse Area. We at the Colorado Open Space Council appreciate the opportunity to respond to this document as provided for under the National Enviromental Policy Act.

We would like to commend the BLM for the format of the Draft Statement, the majority of which is very clear, and for the thoroughness of the report's preparation.

Enclosed is the letter that constitutes our comments concerning the shortcomings of the DEIS according to the Wilderness Workshop of COSC. These comments also carry the endorsements of the Regional Office of the Wilderness Society, and the Wilderness Study Group of the University of Colorado.

Sincerely,

Eric M. Reishus
Environmental Intern for COSC

Enclosure

1325 Delaware Street • Denver, Colorado 80204 tel 573-7870

WILDERNESS WORKSHOP of cosc

District Manager
Montrose District Office
Bureau of Land Management

November 7, 1977

Dear Sir:

In receiving the Draft Environmental Impact Statement for the domestic livestock grazing program for the Uncompahgre Basin Resourse Area, the Wilderness Workshop of the Colorado Open Space Council would like to submit the following comments.

The Draft EIS was found to be deficient in several areas including definitions, proposals for the mitigation of certain adverse environmental impacts, the feasability of certain proposed objectives, and the impacts of certain proposed developments. The Wilderness Workshop feels that the following issues should be addressed before the EIS is deemed adequate.

WILDERNESS

The position taken in the proposal concerning the Dominguez Creeks Area is entirely unacceptable. The Dominguez Creeks area has a strong potential for eventual wilderness designation under the Roadless Area Review and Evaluation. The proposed action of the DEIS provides for developments that are totally inconsistent with wilderness designation. This proposal is unsatisfactory; developments that are inconsistent with potential wilderness designation should not be made before the decision concerning the designation has been made. This represents unrealistic planning and could have adverse effects on the outcome of the wilderness designation by biasing the decision towards the already developed planning framework.

The DEIS proposal states that no other areas in the Environmental Study area have potential for wilderness designation (p. 3-76). Conversely, we feel that several areas boardering on the Uncompahgre National Forest notably areas 4010 (Monitor Mesa) and 4012 (Canal), have potential for wilderness designation. Under the ES proposal these areas would be developed such that this potential would be lost.

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WILDERNESS WORKSHOP of cosc

The narrow-minded approach to these potential wilderness areas does not consider wilderness as a viable alternative, if it is considered at all. The aesthetic and recreational values of wilderness should be considered as important alternatives to grazing and considered carefully. Once the decision has been made to implement the ES proposals and development takes place, there is no path back to true wilderness designation and enjoyment.

WATER AND RIPARIAN HABITATS

The potential problems of surface water quality are eluded to in respect to the proposed Pinion-Juniper chainings when it is stated that chemical elements most likeley to be yeilded by erosion brought on by a "significant runoff event" would be phosphorus and potassium. The results of this phosphorus loading of area streams are not dealt with adequately. Phosphorus is often a limiting factor in algal growth. A potential algal bloom resulting from chemical loading should be discussed.

The proposed grazing plan has adverse effects on several ES area creeks due to over-grazing of riparian habitats along these creeks (p. 5-3). This grazing would lower water quality by increasing sedimentation , increase water temperature (which would adversly affect stream biota), and increase stream bank breakdown which would be detrimental to the aquatic habitats of these creeks. The wholesale writing off of these riparian communities and the accompanying degredation of the entire ecosystem of the area is unacceptable. These areas must be protected from these adverse effects.

Along the same lines, the degradation of these and other streams' habitats that would occur under proposed actions are unsatisfactory. These effects, the by-products of chainings and seedings, would be the result of initial concentration of grazing animals of small pastures. These problems could be mitigated by either decreasing the animal density while manipulated areas return to normal levels of grazing tolerance, or by performing range manipulations on smaller areas of range land at a given time so that overcrowding of animals would not be necessary.

LAND

The proposed action does not state what will be done with the by-products of numerous chaining projects.

WILDERNESS WORKSHOP of cosc

Will the collected brush be left as possible animal habitat, will it be removed from the area, or will it be burned causing reduction in air quality?

Areas that are designated as severe or critical erosion lands should be eliminated from any livestock grazing proposal (alternative E). These areas, once identified, should receive range improvements to ameliorate erosion of topsoil and surface water degradation.

VEGETATION (NON-RIPARIAN)

The proposed action for the protection of the two endangered cactus species (Echinocereus triglochidiatus var. inermis and Sclerocactus glaucus) is absurd. The idea that these plants can be enclosed in designated areas by fences and will not expand beyond them is ridiculus . Indeed, even the idea of keeping an endangered plant species in a restricted area is in itself bad; this action does nothing but help to promote the endangered designation of the plant instead of trying to help it to expand to new areas where it's re-establishment could lead to the plant's loss of the endangered classification.

Also, no source listings or explanations are given for the statement that "grazing diversifies vegetation types" in accordance with the edge effect and bird populations (p. 8-32). Does the act of grazing areas itself help create more edge, or does the management of grazing areas (by range manipulation) help create edge? The first alternative seems unlikely at best and the latter seems improbable due to the increase in monotypic vegetation stands created by range manipulations.

WILDLIFE

The ES proposal takes a poor stance concerning the development of potential black-footed ferret habitats. As an endangered species, the black-footed ferret should rate a more thorough study of potential habitats in the ES area for final determination of whether it is dwelling inside the ES area. S.J. Bissel's adamant statement (p. 2-66) expounds a truly negativistic approach to the problem. Potential habitat should be looked upon as essential until it is proven that no ferrets live in the area. Only then should any kind of development that may disturb this habitat be allowed to take place.

1325 Delaware Street • Denver, Colorado 80204 tel. 573-7870

WILDERNESS WORKSHOP of cosc

Also, concerning the chaining proposals for the ES area, bird habitats are to be left as "blocks of sufficient size" (p. 3-63) for the provision of breeding bird species. However, the terms are not defined so a decision concerning the chances of bird survival in chained areas cannot be made.

Reinstitution of Department of Wildlife (DOW) lands for livestock use is entirely unacceptable. These lands are set aside specifically for wildlife use and would become even more important to area wildlife after implementation of a grazing plan in the ES area. These DOW lands should remain as wildlife refuges, where no competition is experienced between wildlife anr the grazing animals.

The elk-cattle conflict is discussed, but no conclusions are drawn, perhaps due to the lack of data. The conflict is not given any kind of a time element for cessation of the problem; i.e. when elk will use an area that has been previously grazed by cattle. More discussion of the facts involved is needed before any grazing plans involvig use of an elk critical area by cattle can be made.

The offseasonal use of the crucial wintering areas of antelope, mule deer, and elk should be kept to an absolute minimum to ensure the survival of these creatures. Winter grazing of these areas should be eliminated. A twenty-eight percent winter use of these critical areas (as planned for in the ES statement), could be very detrimental to the wildlife species.

As previously stated under the Water and Riparian Habitats section of this letter, the proposed range manipulations should be undertaken over a longer time period to alleviate overcrowding problems on available grazable land. Any large-scale decrease in browse would cause a large disturbance in the corresponding wildlife populations in areas where the large-scale manipulations are performed.

Furthermore, the potential conflicts between domestic stock grazing and calving grounds has not been thoroughly studied in the DEIS. Calving grounds are of primary importance to big game animals and disruption of these animals through competitive grazing during calving is very detrimental to these wildlife populations. This potential problem should be dealt with and any conflicts resolved in the final draft of the EIS.

1325 Delaware Street • Denver, Colorado 80204 tel. 573-7870

WILDERNESS WORKSHOP of cosc

The Wilderness Workshop has found the DEIS to be inadequate in the aforementioned areas and sincerely hopes that the Bureau of Land Management will take these matters into consideration in the preparation of the Final Environmental Impact Statement. Please include these remarks on the official record concerning this proposal.

Sincerely,

Eric M. Reishus

Eric M. Reishus
Environmental Intern for COSC

1325 Delaware Street • Denver, Colorado 80204 tel. 573-7870

WILLIAM E. BRAY
BILL

PHONE NORWOOD 327-4427
REDVALE, COLORADO 81431

8

November 8, 1977

Mr. Marlyn Jones, District Manager
Bureau of Land Management
P. O. Box 1269
Montrose, Colorado 81401

Dear Marlyn:

I wish to coment on Draft of Uncompahgre Basin Resource Area Grazing Environmental Statement. I believe the statement is generally well prepared providing alternates A and C are carried out. I would hope that in actual practice that certain policies and actions could be somewhat flexible.

I believe there is a need for sheep tight fences in certain allotments particularly where they join cattle allotments. The same flexibility should apply to other improvement and grazing management plans.

Sincerely yours,

William E. Bray

William E. Bray

9

STATEMENT OF WARREN COMERER, OURAY COUNTY COMMISSIONER ON UNCOMPAHGRE BASIN RESOURCE AREA GRAZING ENVIRONMENTAL STATEMENT DRAFT

My name is Warren Comerer. I am a County Commissioner in Ouray County, Colorado.

Ouray County depends on mining and agriculture for it's tax base, while some of the businesses in the County are dependent on the tourist business. Nearly fifty percent of the land in our County is federally owned.

The proposed action as described in Chapter One of the Uncompahgre Basin Resource Area Grazing Environmental Statement proposes to continue the Multiple use Concept on Federal resource lands and further proposes through management to improve the National Resource Lands. Multiple use of the Federal lands is essential to our County.

I would endorse the proposed action if there is to be an alternative; Alternative A or alternative C would be all that would be acceptable.

Table (2-17) estimates the deer population in the Uncompahgre Resource Area as 37,283 as of June 1, base population. To feed this number of deer costs at least $750,000 per year. One half of the feed is provided from federal lands; National Forest or Resource land, the other half is provided essentially free of charge from private land owners.

Appendix 5 (A-34) Methodologies for determining big game populations points out the fact that more deer are lost because of winter kill than are harvested by big game hunters. Local people in Ouray County have told me, and I have observed, that game management in the past in Ouray County has been limited to the building up of the herds during one or two light snow fall years only to have catostrophic loss of deer during the next heavy snow fall year.

If B. L. M. is providing 15,538A. U. M. free of charge, for the deer and proposes to provide 23,481 A. U. M's by 2006, the proposed plan in the final DES should assure that the increased A. U. M's would be used for better deer survival and not to merely increase the numbers.

Some of the chapters seem to be biased against livestock grazing and contain some statements that are not true. They should be changed.

Ouray County has County wide Land Use Planning and Zoning (2-94), this should be corrected.

There are many contradictions in the DES that should be corrected, however most of them are not matters of substance. I feel that overall, the DES is adequate.

Thank you for this opportunity to voice my opinion.

Sincerely,

Warren Comerer

Warren Comerer,
Ouray County Commissioner,
District One
Ouray County, Colorado

10

Natural Resources Defense Council, Inc.

2345 YALE STREET
PALO ALTO, CALIFORNIA 94306
415 327-1080

Washington Office
917 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

New York Office
122 EAST 42ND STREET
NEW YORK, N.Y. 10017
212 949-0049

November 7, 1977

Mr. Marlyn V. Jones
District Office
Bureau of Land Management
Post Office Box 1269
Montrose, Colorado 81401

RE: Draft Environmental Impact Statement/
Proposed Domestic Livestock Grazing
Program for the Uncompahgre Basin
Resource Area

Dear Mr. Jones:

We have reviewed the above-captioned draft environmental impact statement (EIS) and have concluded that it does not fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA). Although the draft shows improvement over earlier draft grazing EIS's, it suffers from the same fundamental flaws as they did: i.e., it fails to contain an analysis of the grazing capacity of the proposed grazing areas and it fails to consider meaningful alternatives to the proposed levels of livestock use. In addition, like earlier drafts, its handling of data in general raises serious questions. As the result of these defects, it is evident that the Bureau, and its EIS teams, still have no clear understanding of what an EIS on livestock grazing is supposed to contain and what objectives its preparation is supposed to fulfill - despite the fact that the agency was ordered to begin preparing such statements almost three years ago.

To be adequate, the instant EIS, like all other such statements, must present a site-specific analysis of the environmental impacts of existing and proposed grazing in the Uncompahgre Basin Resource Area. Accordingly, it must supply information designed to allow decisionmakers and the general public to answer two questions: (1) How much grazing, if any, should be permitted in the specific areas involved? And, (2) How should the amount permitted be managed? In order to answer these questions, the EIS

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must contain a rigorous assessment of the capacity of each proposed grazing area to support grazing at any level, as well as a careful analysis of properly selected alternative levels of livestock use. In addition, it must handle data responsibly and in a manner which reveals the impacts that are likely to result from implementation of the proposed action and alternatives thereto. As indicated, this draft fails to meet these requirements, as did the Challis and San Luis drafts. Inasmuch as our previous comments on the San Luis and Challis drafts discuss in detail the manner in which these requirements should be fulfilled, we have enclosed copies of them. Rather than submit extensive comments on the instant document, we offer the following observations for your consideration.

Our review of this EIS reveals that it is based on several unwritten assumptions about the EIS process which, in fact, represent fundamental misinterpretations of NEPA. For example, it seems clear that the authors of the draft have assumed that the proposed action, and in particular the proposed AMPs, are properly conceived and will achieve their stated objectives. Thus, as indicated, this draft, like the San Luis draft, never analyzes the capacity of any proposed grazing area, given its resources and their current conditions, to support the proposed levels and intensities of livestock use. Nor does it analyze the bases for, or propriety of, the proposed designations of particular allotments as suitable for either custodial or intensive management.

The assumption that the proposed action will "work" as designed is also apparent in the EIS's analysis of the impacts which will result from its implementation. For example, the draft blithely asserts that "since grazing is an acceptable use within the recreation lands, any action attempting to better manage and control livestock operations can only serve to improve recreation and livestock compatibility." (p. 3-76—/) (Emphasis added) Similarly, when analyzing the impact of the proposed action on the soils of the study area, the EIS states that the predicted "change in erosion condition from the present to the future is an estimate made by the writer of each AMP. . ." (p. 3-3)

The same assumption is also apparent in Chapter 4 of the draft in which measures necessary to mitigate the adverse impacts of the proposed action are supposed to be analyzed. Despite the fact that the draft reveals that some adverse impacts will result from implementation of the

—/ All page references are to the draft EIS.

proposed action, it considers no direct measures to mitigate those impacts. For example, although aquatic and riparian vegetation will be adversely affected by implementation of certain proposed grazing plans, the draft does not recommend that any of those plans be revised. Instead, the draft only proposes actions to mitigate the impacts of supportive range "improvement" projects, and describes steps that may be taken, if necessary, after the proposed AMPs have been implemented. Curiously, it is only in the alternatives section of the draft, Chapter 8, that any measures which could mitigate the adverse impacts of the proposed AMPs are identified.

Although one of the alternatives discussed in the draft is the elimination of livestock grazing, the alternatives section as a whole is evidently based on the assumption that the BLM should continue to authorize grazing at or near existing levels of livestock use. —/ Four alternatives to the proposed action involving grazing are considered. The proposed action contemplates an increase of about 5,000 AUMs over present use. While one of the alternatives involving grazing contemplates a reduction of about 7,000 AUMs, the others involve reductions of about 1,000 AUMs. See p. 8-103. This range of AUMs is broader than the range analyzed in either the Challis statement or the San Luis draft. In our view, however, it is still insufficiently broad to allow readers to understand and evaluate the trade-offs that authorization of livestock grazing at any level involves. Thus, as we have previously pointed out, these statements, to be adequate, must analyze alternate levels of livestock use which are substantially different from those which exist and/or are proposed.

In addition to revealing the above assumptions regarding ultimate forage allocation and proposed AMPs, the instant draft reveals several other related and erroneous assumptions regarding data in general and impacts in particular. First, the statement reflects the belief that statements identified as "professional judgments" may be taken at face value, and need not be analyzed or evaluated in any manner. See, e.g., pp. 3-3, A-28. In addition, it reflects the view that the applicability of published studies to the

—/ No one really expects the Bureau to eliminate grazing in the Uncompahgre Basin Resource Area. Nonetheless, that alternative should be included in all EIS's: if properly analyzed, it will provide essential baseline resource data against which to measure the results of all other alternatives considered, including the proposed action.

subject area need not be demonstrated. Similarly, it reflects the view that once the reasons for adopting a given position have been set forth, these reasons need not be evaluated. See, e.g., pp. A-24, A-26, Items 1-5. Finally, the draft indicates a belief that all that need be done with respect to missing data is to acknowledge their absence.

In our view, these assumptions overlook essential obligations imposed by NEPA on the Bureau. Indeed, they mask and/or insulate the very judgments, reasons and data gaps that the EIS process was designed to reveal and subject to close scrutiny. Thus, as we have previously pointed out, generalized references to pre-existing AMPs in the study area, published research studies and/or professional expertise will not suffice to fulfill NEPA's requirements. See, e.g., our comments on the San Luis draft, p. 11. The actual results of these AMPs, as well as the reasons why the published studies are believed to be applicable and the manner in which they were utilized, must be supplied. Professional judgments must be evaluated according to some specified criteria. Similarly, it is not enough merely to acknowledge that certain data are unavailable. The EIS should analyze what effect, if any, the absence of that information had, or should have had, on the formulation of the proposed action. It should also indicate how and when those data will be obtained.

Finally, the instant draft, like previous drafts, indicates that BLM officials apparently are continuing to make certain assumptions about the EIS process. They apparently assume that they are under no obligation to provide any specific guidance regarding the contents of this and other grazing EIS's. They seem to assume that, despite this lack of guidance, one of the teams assigned to prepare these EIS's will, eventually, produce a document which complies with NEPA and the opinion and order in NRDC et al. v. Morton et al. Finally, they apparently assume that this approach to EIS preparation constitutes an appropriate way to utilize the Bureau's limited funds and personnel. The issuance of this statement only confirms our belief that these assumptions are fundamentally incorrect. The approach taken by the Bureau to date is irresponsible and a waste of time and money. The Public Lands do not deserve, and cannot afford, to bear the environmental consequences of this approach. The Bureau must provide guidance to the EIS teams, in the form of standards for the contents of future statements, in order to ensure that those statements are adequate and that necessary management decisions are identified and implemented.

Thank you in advance for your consideration of these comments.

Sincerely,

Johanna H. Wald

JHW:sja
Enclosures

cc: Dale Andrus, State Director
Colorado State Office
Bureau of Land Management

George Turcott, Acting Director
Bureau of Land Management

Gail Achterman, Esq.
Special Assistant to the Solicitor
Office of the Solicitor
Department of the Interior

(11)

Statement of WAYNE A. GORE
Delta County Commissioner and User of B.L.M. Lands
R. 2 Box 306
Delta, Colo.

Re: UNCOMPAHGRE BASIN RESOURCE AREA GRAZING ENVIRONMENTAL STATEMENT

After reviewing the draft of the Uncompahgre Basin Resource Area Grazing Environmental Statement, we are in general agreement with most of the proposed plan. However I feel Livestock should have a more positive approach.

Chapter 3 indicates that Livestock Grazing is responsible for increased erosion and runoff, soil compaction and destruction of wildlife habitats. Statements such as this are biased, with out fact and could bring undue criticism.

In chapter 8, Alternative A is the most acceptable. Many of the points in Alternative C should be combined in Alternative A to hasten the rate range improvement with more cooperation between the permittees and other users. To allow the permittee to carry out long term range improvement programs, the ten year permit should be used in both Alternatives. Cost of implementing Alternative B would have a detrimental effect on the livestock industry, on the economy of each community in our area, as well as the local tax base.

The specific grazing dates in P. 1-18 should be relaxed to allow for annual growth vegetation differences.

P. 1-29. As users of B.L.M. Lands I question the use of waterbars to discourage vehicular traffic. Vehicle traffic is found where no trail even exists.

P. 1-46, 47, 48. If management decisions on Public Lands forces the users of these lands to rely more on their deeded lands during the spring, summer and fall, winter range forage for big game animals on these same deeded lands would be critical during the winter months.

P. 2-101, 102. The committee labeling of local people as conservative is unjust. The fact that local people have the fortitude to make long range plans and to properly carry them thru, should not label them as conservative in their socio-political attitudes.

P. 3-11. When defining grazing intensity, time should be considered.

P 3-12. Soil on native range with limited carry capacity is not compacted. Annual freezing and thawing of these areas causes heaving in the soil to minimize these effects.

P. 3-18. It is a proven fact that complete range rest rotation will not work. Utilization of mature plants under natural conditions indicates that up to 50 percent forage removal is not detrimental.

P. 3-58. Deer and livestock do not compete sufficiently to cause deer to abort. Disease and coyote control would alleviate this condition.

P. 3-60. The users of Public Lands know that cattle and elk will graze together. There are several unsubstantiated statements on this page that should be deleted.

P. 3-61. Cattle graze and are not usually dependent on shrubs and trees for forage. They, therefore, would not be in competition with the porcupine. Many mammals tend to increase as vegetation is grazed. Case in point--the prairie dog.

P. 3-64. "Grazing these plants in fall and winter after their food reserves are stored and during their dormant period can limit the ability of the plant to regrow the following spring." Is this a correct statement? Or have all the grazing technicians been giving us false information over the years?

P. 3-65. Livestock grazing does very little damage to riparian vegetation and stream banks. Even in the absence of livestock, there will continue to be water turbidity, sediment yield and unstable stream banks as evidenced by flash floods and high water runoff. This section should either be deleted or rewritten.

P. 8-30. The assumption is that if grazing were eliminated there would be a tremendous increase in vegetation, etc. This should be corrected and rewritten. Only if there is adequate rainfall will there be lush vegetation.

In summary, we need these areas for the production of food and fibre. Whatever is incorrect, lets correct it and get on with the management plan to produce the food and fibre that's needed to help feed a hungry world.

(12)

MUSSER RANCHES

ESCALANTE ROUTE
DELTA, COLORADO 81416

Phone
(303) 874-9559

I am a rancher from Delta, Colorado.

Following are my comments on the Uncompahgre Basin Resource Area Grazing Environmental Impact Statment Draft.

It is too bad that there has been all the time and money spent to compile this data to satisfy such a small segment of the people.

The statement of the Uncompahgre Area is full of bias against grazing livestock. Some of them are:

Porcupine would be affected by grazing.--

Porcupine prefer bark from trees--especially fruit trees--cattle do not.

elk do not live compatably with cattle.--

Elk in Montana must be different from the ones in Colorado. For many years I have seen a tremendous elk population increase where elk and cattle are grazing together on the same area.

Stream bank deterioration by grazing and trampling--

Cattle causing erosion. Erosion is a natural thing that has been happening always and will happen without any livestock grazing. People and vehicles cause more erosion than livestock or wild life.

This is to mention only a few examples.

Alternative A is the most acceptable course to follow for several reasons.

1. The idea that rest rotation grazing of livestock is beneficial is erronous. In this area it would not be beneficial to either livestock or the land.

2. At the inception of the Taylor Grazing Act, the livestock people were the only group that was interested in doing anything to improve the Public Domain.

3. The livestock users are the users that pay to use these lands and we can't see why such a negative attitude is taken concerning grazing.

It is time for the BLM personel to go ahead and administer the BLM lands without so much input from misinformed groups. The BLM was doing an adequate job before these groups became so vocal.

Thank you for giving us the opportunity to make this statement.

Jack Musser

MUSSER BEEFMASTERS – MEMBER OF FOUNDATION BEEFMASTER ASSOCIATION

13

OFFICE OF THE STATE ARCHAEOLOGIST

1300 Broadway
Denver, CO 80203
303-839-3391,2,3

November 9, 1977

Mr. Dale R. Andrus
Director
Colorado State Office
Bureau of Land Management
1600 Broadway
Denver, CO 80202

RE: Draft Environmental Statement, Proposed Domestic Livestock Grazing Program for the Uncompahgre Basin Resource Area #1792: Archaeological Resources

Dear Mr. Andrus:

The Office of the State Archaeologist has received and reviewed the Draft Environmental Statement (DES) for the Proposed Domestic Livestock Grazing Program for the Uncompahgre Basin Resource Area, #1792. (The State Historical Society's Department of Historic Preservation will independently comment upon architectural/historical resources.)

Archaeological resources have been adequately considered for compliance with Executive Order 11593 and the National Historic Preservation Act of 1966, implemented by 36 CFR 800.

The report is excellent in addressing the Adverse Effects of the proposed project (ch. 3) and Mitigating measures necessary to eliminate or reduce the Adverse Effect (ch. 4).

We do recommend the following minor clarifications be included in the Final Environmental Impact Statement:

(1) All archaeological sites should be given official State Historic Preservation Officer site numbers (obtained from the State Archaeologist) and Colorado site forms should be filed in this Office.

(2) The National Register of Historic Places and pending nominations to the National Register were checked to determine the status of the five sites listed on p. 2-73. None of the sites had been nominated or were pending nomination, at that time.

It was established, through personal communication, that the necessary procedure for nominating these sites to the National Register had been delayed and

clarification of this issue is in process.

(3) All sites on Table A-13 are listed as either of "Local," "State and Local," or "National, State and Local" SIGNIFICANCE. Does this mean that the sites are significant by the Agency's criteria, or are they eligible to the National Register of Historic Places by the criteria set forth in 36 CFR 800.10? The question is "What is significant?" You should specify what criteria you have established to determine significance. A category showing eligibility to National Register of Historic Places or non-eligibility would be appropriate for Table A-13.

If we can be of continued assistance to you, please call upon EIS Reviewer Betty LeFree.

For the State Historic
Preservation Officer

Bruce E. Rippeteau, Ph.D.
State Archaeologist Colorado

BER(BJL):ng
cc: Hart, SHPO
Schmuck, Clearinghouse
Scott, BLM, Montrose Dist

14

Comments concerning the
UNCOMPAHGRE BASIN RESEARCH AREA GRAZING ENVIRONMENTAL STATEMENT

page iii--Summary of Environmental Impacts. It is debatable that "Terrestrial wildlife havitat would improve, resulting in population increases".

The numerous proposed improvements could not be made without the use of roads. I sincerely question that water bars would deter future use of these roads and they will entice many 4-wheelers who are looking for just this--primative roads into primative areas. This increased traffic will itself denude many acres and add greatly to erosion. Wells and springs will become favorite camping sites. This of course is acceptable under multiple use, but is extremely detrimental to wildlife. Deer and elk, contrary to your statement, can and do live compatably with cattle and sheep, but not with people.

It looks very well on paper that water development would improve grazing conditions. However, this would make a concentration of wildlife and livestock (if not people) and areas close to watering holes would be over used and over trampled. At the present, in some areas, livestock graze over the entire area and only in the winter months at a time when the range is not vulnerable. With winter grazing, vegetation is not destroyed even when fully utilized. With the proposed water development, spring usage is recommended and this could be damaging to vegetation especially in dry years when early summer moisture is not sufficient to rejuvinate the growth. At the present there is no concentration of livestock, but the addition of many miles of fences would again cause livestock concentration.

The livestock operator will be paying for his use of the BLM lands, yet it is he who will be responsible for keeping all wells, springs, and pipelines cleared of litter. The litter left by livestockmen is nil compared to the litter left by campers, sportsmen, & 4-wheelers.

It is stated that the overall objective of the proposed action is to increase livestock/wildlife forage. With the increased grazing fee, and the cost of maintaining the so called improvments, it would be nearly impossible to recover the cost through grazing of livestock. It should be remembered that large numbers of deer and elk graze on deeded land. Any decision that might force ranchers to graze on private lands more heavily, will be detrimental to wildlife.

In many areas, especially where there is winter grazing, rest rotation and fences is not the answer.

It is unfortunate but very apparent that the ES was researched to a large extent by inexperienced people who were not familiar with the area, and knew little about livestock grazing. It is regrettable that so much money, money which could have been used for range improvement, was spent compiling the ES.

The proposed action, while acceptable to some, is not the most desirable to all. In areas, where ranchers are willing, Alternative A (Continuation of present grazing program) would be the most acceptable. To some ranchers the proposed action could be economic disaster. To these, Alternative A would be the most beneficial to the rancher and wildlife, and would more nearly preserve the untamed, untrampled areas for the future generations.

15

Norwood Colo 81423
Box 356
Nov 8, 1977

RECEIVED
NOV 14 '77
BLM Montrose Dist.

Bureau of Land Management
Montrose District
Box 1269
Montrose Colo 81401

Gentlemen:

This is to enclose the statment of Laverne Phelps Concerning the Uncompahgre Basin Resource Area Grazing Environmental Statement.
The Laverne Phelps statment was made at the Montrose hearing Nov. 1.
I am a Rancher and graze cattle on B.L.M. Lands as well as National Forest

Edwin Jacobs

16

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS: Post Office Box 25087, Denver Federal Center, Denver, Colorado 80225
STREET LOCATION: 502 Miller Court, Lakewood, Colorado, Telephone 234-2634

IN REPLY REFER TO: 53039

RECEIVED
NOV 14 '77
BLM Montrose Dist.

NOV 1977

MEMORANDUM

To: Bureau of Land Management, Montrose, Colorado

From: Assistant Regional Director, Land Use Coordination

Subject: Uncompahgre Basin Resource Area Grazing Draft Environmental Statement, Colorado (DES 77-32)

We have reviewed the subject document and find that it adequately addresses the environmental concerns of this Bureau.

Robert D. Albins
Robert J. Arkins

17

Department of Local Affairs
Colorado Division of Planning
Philip H. Schmuck, Director

STATE OF COLORADO 1876
Richard D. Lamm, Governor

November 9, 1977

Mr. Dale R. Andrus, State Director
Bureau of Land Management
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202

SUBJECT: Draft Environmental Impact Statement
Uncompahgre Basin Resource Area Grazing

Dear Mr. Andrus:

The Colorado Clearinghouse has received and distributed the above-referenced environmental statement for review by state agencies. Enclosed are comments pertinent to the proposed grazing plan.

Thank you for the opportunity to review this plan.

Very truly yours,

Charles G. Jordan
Senior Planner

Reviewed: Philip H. Schmuck
Philip H. Schmuck, Director

CGJ/vt
Enclosures

cc: Office of the Governor
Department of Natural Resources
State Historical Society
District 10 Regional Planning Commission

RECEIVED
NOV 14 '77
BLM Montrose Dist.

520 State Centennial Building, 1313 Sherman Street, Denver, Colorado 80203 (303) 892-2351

18

RICHARD D. LAMM
Governor

C.J. KUIPER
State Engineer

DIVISION OF WATER RESOURCES
Department of Natural Resources
1313 Sherman Street - Room 818
Denver, Colorado 80203
Administration (303) 892-3581
Ground Water (303) 892-3587

October 7, 1977

MEMORANDUM

TO: PHILIP H. SCHMUCK, DIRECTOR, COLORADO CLEARINGHOUSE

FROM: DR. JERIS A. DANIELSON, DEPUTY STATE ENGINEER

SUBJECT: UNCOMPAHGRE BASIN RESOURCE AREA GRAZING
DRAFT ENVIRONMENTAL STATEMENT

Our concern in the matter of increasing utilization of grazing lands is as follows:

Water and land management direction should minimize negative impacts on the amount and timing of water available for downstream use, thereby, maintaining the quality of established downstream water rights.

If new wells are to be used to provide additional water supplies, application for well permits must be made with this office.

Jeris A. Danielson
Jeris A. Danielson

JAD/WWB:mvf

RECEIVED
OCT 13 1977
DIV. OF PLANNING

(19)

THE STATE HISTORICAL SOCIETY OF COLORADO
Colorado State Museum, 1300 Broadway, Denver, Colorado 80203

October 14, 1977

RECEIVED
OCT 24 1977
DIV. OF PLANNING

Mr. Philip H. Schmuck
Director
State Clearinghouse
520 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

RE: Uncompaghre Basin Resource Area Grazing Environmental Statement

Dear Mr. Schmuck:

This office shall comment concerning only architectural and historical properties that may be located within the impact area of the proposed undertaking; the office of the State Archaeologist will respond separately concerning archaeological properties.

It is our understanding that compliance with the environmental impact requirements of Section 102(2)(C) of the National Environmental Policy Act and regulations thereunder should include compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and Executive Order 11593. This statement is incomplete in that it does not contain evidence of compliance nor does it contain provisions to insure future compliance.

We note that the Bureau of Land Management (BLM) has identified four National Register properties and three other properties that possess architectural and historical value within the impact area of the undertaking. Since these properties are within the impact area of the undertaking, the BLM should consider the effect of the undertaking upon them, as required by Section 106 of the National Historic Preservation Act of 1966, as amended.

To do this, the BLM should consult with the State Historic Preservation Officer (SHPO) to evaluate the eligibility of the properties identified and the effect that this undertaking will have upon all properties included in or eligible for inclusion in the National Register. If eligible properties will be adversely affected by the project, the BLM should obtain the comments of the Advisory Council on Historic Preservation in accordance with the procedures set forth in 36 CFR Part 800.

If we may be of assistance in this process, please contact Michael Quinn at 892-3394 or at the above address.

FOR THE STATE HISTORIC PRESERVATION OFFICER

Sincerely,

James Edward Hartmann
Curator, Historic Preservation

cc: Colorado West Area Council of Governments
District 10 Planning Commission
Advisory Council on Historic Preservation
Council on Environmental Quality

(20)

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)

November 8, 1977

Mr. Philip H. Schmuck, Director
Colorado State Clearinghouse
520 Centennial Building
1313 Sherman Street
Denver, CO. 80203

Dear Mr. Schmuck:

This Division has had the opportunity to review the draft of the Uncompahgre Basin Resource Area Grazing Environmental Statement prepared by the Bureau of Land Management. The Division's comments and recommendation relative thereto are enclosed as well as some publications referred to in the response. We respectfully request that both our comments and the publications be passed on to the Bureau.

Generally speaking, the Bureau did an outstanding job in preparing this statement. It is apparent that there was considerable liaison with Division of Wildlife field personnel prior to writing the statement. This Division greatly appreciates the considerations given to wildlife in this statement.

The proposed action, while better than the status quo, Alternative A, leaves a lot to be desired as far as wildlife is concerned. This Division strongly favors some reduced livestock grazing as suggested in Alternative D.

A provision for renewed grazing of the Billy Creek Allotment under the proposed action is particularly distressing to the Division. The base property in this allotment is owned by the State of Colorado and is recognized as a crucial winter range for both deer and elk.

We hope our comments and recommendations will prove helpful to the Bureau in writing the final statement.

Sincerely yours,

Jack R. Grieb
Director

Robert L. Hoover
Wildlife Environmentalist

RLH:jb
Enclosures:
Comments and Recommendations
Shepherd (1971)
Braun et al. (1977)

cc: H. Sherman
Director
R. Evans
P. Barrows
R. Rosette
B. Baker

COMMENTS AND RECOMMENDATION ON
UNCOMPAHGRE BASIN RESOURCE AREA
GRAZING (DRAFT) ENVIRONMENTAL STATEMENT 1/

Page	Comments or Recommendations
1-3	Custodial management should be defined when first used here; it isn't described until Page 1-21. Perhaps it would be well to also include this term in the Glossary.
1-21	Trespass Control: Does BLM presently have sufficient positions and funds to effectively control trespass as stated here, or would some of the additional positions mentioned in the following paragraph be needed to accomplish this?
1-29 & 1-30	Fences: Fencing specifications described on Page 1-29 and illustrated on Page 1-30 meet some but not all Division of Wildlife (DOW) fencing specifications. For three-wire fences (Item No. 6), distances from the ground to the bottom and top wires are acceptable as stated. No mention is made, however, of the location for the middle wire, which should be 12 inches below the top wire to minimize likelihood of entangling big game animals that jump fences. Please refer to Figure 1-3 in San Luis Valley Resource Area Grazing Draft Environmental Statement for details on three-wire fencing. Specifications under Item No. 7 and in Figure 1-2 should be modified to reduce overall height to 42 inches while maintaining same 16-inch and 12-inch spacing of the bottom and top two wires, respectively. The DOW would prefer to see smooth top wire on fences in deer, elk and bighorn sheep ranges. Boundary markers are mentioned for unfenced BLM tracts but not for those under fence. Please refer to DOW comments on Page 1-57 of San Luis Valley statement.

1/ Submitted to Colorado State Clearinghouse by Colorado Division of Wildlife, November 8, 1977.

1-29	Pipelines: In Para. No. 1, add "and wildlife" to end of sentence. Also disturbed areas along pipelines should be revegetated with native species.
1-34	Springs: In computing capacity of storage tanks at spring developments, wildlife needs should also be considered.
1-39	Earthen Reservoirs: Include use by wildlife in first sentence of Para. No. 1. Also the DOW would recommend changing the Para. No. 3 in this section to read "...to exclude livestock but not wildlife..." Chaining and Reseeding: Where practical, reseeding should also include browse species. If seeding of browse isn't practical and there is little likelihood for natural establishment of browse plants, other measures should be taken (see third Para. on Page 1-47).
1-46	Planning Goals: Fencing recommendations here are good as far as they go, but should specify a minimum of 12 inches between top two wires.
1-47	Reference first Item No. 4 on left side of page, the DOW makes these comments. Since reseeding of browse and forb species is not always practical or successful, a blanket requirement to use these may not be appropriate (See I-39 comments on Chaining and Reseeding above). If Item No. 6 on left side of page is true, the suggestions for changing fencing specifications suggested earlier in this response should be made. BLM Energy Minerals Program: In the last sentence on this page, change to read "...the total loss of livestock and wildlife forage..."
2-25 & 2-29	The common names of rubberweed and yellowbrush for Chrysothamnus are not widely accepted. We would suggest either of the following reference for standard plant names: American Joint Committee on Horticultural Nomenclature. 1942. Standardized plant names. J. Horace McFarland Co., Harrisburg, Pa. 675 p. Beetle, A.A. 1970. Recommended plant names. U. of Wyo. Exp. Sta. Res. J. 31. 124 p.
2-29	In last sentence of left column, correct spelling of "vermiculatus."

2-46	Wildlife, Terrestrial: There are several errors of omission and commission relative to introduced wildlife species. The antelope is an indigenous species to the area that was eliminated in the early 20 Century and subsequently restored by trapping and transplanting programs. Wild turkeys were also indigenous to the Resource Area. Historical accounts indicate these birds were plentiful in the early 1880's but disappeared for unknown reasons in the late 1880's. Birds were restored in the 1940's by a trapping and transplanting program. Gambel's quail are exotics that were introduced from California many years ago, some of the first being released near Montrose in 1885. These birds have adopted well to Colorado and have undergone enough change in their characteristics that they are now recognized as a separate subspecies by some workers. Attempts to establish Hungarian partridge, bob white quail and California mountain quail in the area have been unsuccessful.
2-55	Pronghorn Antelope: As mentioned above, this species was restored, not introduced. Field personnel of the DOW say population numbers here are probably closer to 250 than the 350 animals mentioned in the text.
2-61	Additional Cattle-Elk Conflict: DOW field personnel are not convinced the statement here"...that elk will not use an area where cattle are present or where they have been..." is valid for Colorado where these two species share the same ranges. There is some evidence, however, to support some lack of tolerance between elk and antelope on one hand and domestic sheep on the other.
2-62	Diet Overlaps: Material in Table 2-24 is reportedly taken from Hansen and Reid (1975). Although Table 2-24 includes diet overlaps for antelope, the Hansen and Reid paper doesn't mention antelope. The source of the antelope data should be documented.
2-63	Black Bear: The importance of carrion, acorns, berries in addition to serviceberry and other fruits in the diet of the black bear should not be overlooked. Other Species: The importance of furbearers and varmints is summarily dismissed here. Important economically for their fur are beaver, coyotes, and bobcat. Furthermore, the latter two species are of major concern to livestock owners because of their depredations on calves and sheep.

2-65	Upland Game Birds: Chukars were also released in Wells Gulch. Raptors: Accipitrine hawks were overlooked in the presentation on raptors. Endangered Species: Although river otter are on the State list of endangered species, they are not yet on the Federal list. Essential nesting and hunting habitats for the peregrine falcon have been identified in two portions of the resource area by the DOW. These include the lower Black Canyon and eastern Ouray County. The latter area has had an active nest for several years.
2-66	River Habitats: Since the endangered Colorado squawfish has been reported from the Gunnison River in Mesa County and its historical range extended well into Delta County, this species may yet occur in the Resource Area. Likewise the humpback and bonytail chubs historically occurred in the Area. The humpback sucker is not classified as endangered, but threatened by the Colorado Wildlife Commission. Extensive creel census information is available for the Gunnison River from its confluence with North Fork upstream to Crystal Dam. Bill Wiltzuis has this data in the DOW Montrose Regional Office.
2-79	Hunting: Mention is made of "numbers of deer hunted per county." There is no such parameter for which statistics are available. The expression should be in terms of total numbers of hunters hunting in the county.
2-102	Climate: If there will be no change in the climate by 2006 without the proposed action, does it then follow that there will be a change if the proposed action is implemented?
2-103	Wildlife Terrestrial: The word "wildlife" in the last sentence of Para. No. 1 in the right column should be changed to "big game." Reference to "hypothetical" populations of peregrine falcons should be deleted since this species is known to occur in the Area.
2-118	The impacts of the Dallas Creek Project and the Dominguez Dam Project on wildlife and recreation are mentioned under headings of Wildlife and Recreation, respectively, yet no mention is made in these presentations of the impacts of the Fruitland Mesa Project.

However, the existence of this project is subsequently acknowledged under Agriculture on the same page.

3-18 Grazing Management: In Para. 2, right side of page, mention should be made to results of the Mesa Verde browse study (Sheperd 1971, P. 89-94), especially since the environment of this study is closely comparable to much of the Resource Area in elevation, vegetation, climate and other features. A copy of this work (Sheperd, H.R. 1971. Effects of clipping on key browse species in southwestern Colorado. Colo. Div. Game, Fish & Parks Tech. Publ. No. 28. 104p.) is included with this response for ready reference.

3-48 Reference to McKean and Bateman in right column is in error. The junior author's name should be corrected to Bartmann. The same correction should be made on Pages 3-59 and A-80.

3-58 The last Para., left side of page, and continuing on right side of page should be rewritten to clarify meaning.

3-60 Reference third Para., see comment for Page 2-61.

Deer and Elk: Deer mortality from added fences could be minimized by following specifications suggested earlier.

3-62 Upland Game Birds: In addition to enhancing sage grouse, water developments could also benefit chukar partridge. In fact, in those instances where water is a limiting factor, water developments could extend the range of the chukar.

No mention is made here of possible adverse impacts on sage grouse from manipulation of sagebrush vegetative types. Perhaps such projects are not contemplated.

3-64 & 3-65 Riparian Habitats: Arguments and conclusions presented here are contradictory. Published results of studies indicate rest rotation grazing systems do not help riparian habitats, yet the conclusion is drawn here that there will be a net overall improvement of 28.9 miles of stream riparian habitat as a result of the proposed action.

There is a statement at the bottom of Page 3-64 to the effect that "About the only way to preserve such values (riparian habitats) is to fence off the area from grazing." Simply then why is not fencing included as a Proposed Improvement to protect riparian habitats?

4-5 Sage Grouse Population: A copy of a paper pertinent to maintaining sage grouse habitat is enclosed for your information (C.E. Braun, T. Britt and Richard O. Wallestad, 1977. Guidelines for maintenance of sage grouse habitats. Wildl. Soc. Bull. 5 (3): 99-106).

8-21 It is difficult to understand how ranges in good condition can be increased by 65% and those in poor condition decreased by 27% under Alternative A without some benefit to wildlife.

8-26 It is also difficult to comprehend how hunter success ratios would decrease under Alternative A when wildlife populations are predicted to remain constant.

8-31 The assumption made here that the DOW would not increase hunting opportunity is probably erroneous.

8-32 The assumption that elk would replace deer under Alternative B because of a difference in food habits is questionable. Although elk depend more on grass than deer for winter forage, an estimated (Burdick) 40 to 50% of the winter diet of elk is made up of browse in this area.

The cause and effect relationship expressed in the last paragraph in the left hand column is completely erroneous and, therefore, should be deleted. Deer numbers have declined elsewhere where elk are not present and elk have increased elsewhere where these species don't share common ranges. We will have more to say about the situation in the Billy Creek Allotment elsewhere in this response.

Wildlife, Aquatic and Riparian - No mention is made of the increase in terrestrial wildlife that would occur in riparian areas under Alternative B. Grouse, wild turkey, chukar partridge, quail and rabbits, as well as furbearers like beaver and maskrat, would increase in number with improved riparian habitats.

8-61 Wildlife, Aquatic and Riparian: Conversely to Alternative B, immediately above, riparian habitats of the same wildlife species would be degraded.

8-66 Description: Of those components mentioned for Alternative D, reduced livestock grazing, Components 1a and 1b, 5a, 6 and 9 would definitely benefit wildlife.

A-73 The definitions of "Endemic" and "Habitat" set forth here are faulty. Endemic has nothing to do with population levels or destructive species, it is a term used to describe those species which are native or unique to an area. Habitat is not restricted to physical conditions necessary for a species but also includes chemical and biological conditions.

A-74 Limiting factors not only relate to habitat requirements. They can also include mortality factors such as predators, poaching, excessive legal hunting, or interspecific intolerance.

Additional Comments & Recommendations

Choice of Alternatives

Of those alternatives presented, the DOW would prefer Alternative D, reduced livestock grazing, because it provides the greatest benefits for wildlife. As second and third choices, the DOW would select Alternatives E and A. The proposed action would fall between these two alternatives. Alternative C is unacceptable as far as the DOW is concerned.

Billy Creek Allotment

The Billy Creek Allotment has been in non-use as far as livestock use is concerned for several years and the DOW would prefer that this status be maintained rather than the rest rotation grazing plan suggested by BLM under the proposed action. Following is the DOW's rationale for non-use by domestic livestock.

Out of a total of 3,995 acres in this allotment 240 acres are classified as crucial deer winter ranges in poor condition (Table 2-13, Page 2-50) and 3,310 acres are crucial winter elk range in poor condition (Table 2-15, Page 2-52). By BLM's estimates (Table 2-11, Page 2-42), there are 265 AUM's of forage produced annually on this allotment.

Between 350 and 500 elk use this range for 4 months out of the year and approximately 500 deer for 6 months. Using three elk and four deer as AUM equivalents, wildlife alone exerts between 1217 and 1415 AUM's of grazing pressure on this allotment. Since this grazing pressure far exceeds the the 265 AUM's of forage estimated to be present here, any increase in use from domestic livestock could only result in competition for a limited forage supply.

The DOW is not convinced the three treatments recommended for rest rotation grazing of this allotment will result in improved range condition. Spring use of one pasture and fall use of another by cattle will result in competition between deer and elk on one hand and cattle on the other (Table 3-10, Page 3-49), which will shift wildlife use to the third pasture that is being rested from cattle use. It is believed the resulting increase in use on this third pasture by deer and elk will be sufficiently heavy to negate any benefits hoped to be obtained from rest rotation grazing.

Literature Omission

A noteable omission in the draft statement was any reference to a seminar on Improving Fish and Wildlife Benefits in Range Management conducted at the 41st North American Wildlife and Natural Resources Conference that was co-sponsored by BLM. The DOW recommends the proceedings of this seminar be reflected in the final environmental statement. Copies of the proceedings are available from the Office of Biological Services, Fish and Wildlife Service, Washington, D.C.

United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

(21)

IN REPLY
REFER TO: 705

500.

Memorandum

To: Director, Office of Environmental Project Review

From: Commissioner of Reclamation

Subject: Review of Draft Environmental Statement (DES) for Uncompahgre Basin Resource Grazing Program (DES 77-32)

We have reviewed the subject DES and offer the following comments for your consideration.

Page 1-46 - Dallas Creek Project - There appears to be a misunderstanding regarding cancellation of grazing permit allotments adjacent to the proposed Ridgeway Reservoir (Dallas Reservoir) side. The second paragraph on page 1-46 of your DES reads, "Construction of the Dallas Creek Project will result in a cancellation of eight allotments totaling 2,410 acres . . . ." In a letter dated April 28, 1977, to Goldman and Kagon, attorneys for Mr. B. Curtis Smith, one of the landowners in the project area wrote, "The lands involved in the lease are being used for mitigation purposes for wildlife as are several other leases adjacent to the Dallas Reservoir." Only a small part of the allotments to be cancelled, if any, will be used for wildlife mitigation purposes.

It is true the properties acquired by the Bureau of Reclamation were base properties of the permittees. In some cases only partial amounts of the base properties were acquired. It appears that in those cases the land owners may still have sufficient land to be used as base property to qualify for their previous permit allocation. In cases where total base property was acquired, it would also appear the landowner should have been given an opportunity to purchase replacement base lands and have the permits transferred to them. Public and private land acquired by Reclamation for development of the Ridgeway Reservoir (Dallas Reservoir) will be inundated for reservoir operation. Those lands above reservoir high water line will be used for recreation and wildlife purposes. Livestock grazing will not be permitted.

The cancellation of the grazing permit allotments has adversely affected the negotiations of properties required for the reservoir right-of-way. Closer cooperation between the Bureau of Reclamation and the Bureau of Land Management might possible have eliminated many of the problems encountered. In the future, Reclamation will coordinate the elimination of grazing permits with the Bureau of Land Management when planning the aquisition of private property for a Bureau Project.

Page 1-48 - Dominguez Project - It is stated in the DES that the Dominguez Project is an irrigation and hydroelectric project. Power generation and recreation are the most significant purposes of the project. Little, if any, irrigation for the project is being planned.

Page 1-49 - There appears to be erfor in either the narrative or in table 1-13. Only seven grazing allotments are listed in the table while the narrative references eight allotments.

Page 2-113 - The statement is made in the EIS that, "No significant changes are expected for nongrazing agriculture by 2005. Water for irrigation is presently oversubscribed, and suitable privately owned land available for agricultural development exceeds water supplies." This statement is not entirely true and is in conflict with the following paragraph which describes proposed irrigation practices on the project. The development of the project reservoirs to store water during the high spring runoff for later irrigation during the growing season can potentially increase the irrigated acreage in the study area.

Page 2-118 - Last Paragraph - The Fruitland Mesa Project was not founded in the fiscal year 1978 program. The contract for relocation of U.S. Highway 50 around the Ridgeway Reservoir Basin (Dallas Reservoir) was executed on September 29, 1977 by the signing of contracts between the Tri-County Water Conservancy District and the municipal and industrial water users was approved by the Commissioner of Reclamation R. Keith Higginson.

Page 2-118 - The Whitewater Project name has been changed to Dominguez Reservoir Project and the Cactus Park Dam and Reservoir has been changed to the Grand Valley Unit utilizing diversion structures for water control.

2

...e 3-47 - The discussion of the action on endangered plant species (proposed) raises more questions that it answers; for example, such statements as the ". . . . proposed action could be detrimental to Echinocercus triglochidiatus var. inermis" and ". . . . would be harmful to Penstemon retrorsus populations in that their critical habitat would be disturbed," should be expected so that the reader can know if the proposed actions are a threat to the continued existence of these species.

Chapter 4 - This chapter is titled "Mitigating Measures not Included in the Proposed Action." The title seems to indicate that these measures will not be taken, yet, the first paragraph of the chapter states that "all measures are considered feasible under existing technology and would be required if the proposed action is proposed." This chapter should be clarified as to what mitigation proposals will be implemented.

bcc: Regional Director, UC
W. O. Code 150, 400

LBR:RWNash:pgm 11/16/77

(22)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

Ref: 8W-EE
D-BLM-J99004-CO

NOV 14 1977

77 NOV 17 AM 11:02

Dale R. Andrus, State Director
Colorado State Office
Bureau of Land Management
Department of the Interior
1600 Broadway
Denver, Colorado 80202

RECEIVED
NOV 22 '77
BLM

Dear Mr. Andrus:

The Region VIII office of the Environmental Protection Agency has completed its review of the draft Uncompahgre Basin Resource Area Grazing Environmental Statement. On the whole, the draft we received appears to be fairly complete in the areas it covers. However, we would like to offer the following comments to assist you in writing the final document.

From statements made on pg. 3-16, it appears that an inadequate water quality data base exists in the study area. Apparently, grazing should not significantly degrade water quality but a few deficiences should be corrected. There is a major inconsistency between Chapter 3 and Chapter 5 of the document. Chapter 5 predicts lower water quality and negative impacts for trout fisheries due to sediment from runoff from BLM lands. Chapter 3 states that the same segments will improve as a result of the proposed action. This inconsistency should be cleared up and measures proposed to prevent degradation of water quality and riparian habitats.

The EIS fails to mention the possibility of violations of the State Water Quality Standards or the State's non-degradation clause as these relate to the proposed grazing activities. For example, the EIS mentions that up to 30,000 acres may be improved through chaining. What are the short and long-term implications for water quality from this activity?

The discussion on pg. 1-48 of the document on the 208 program is an inadequate treatment of the relationship between 208 and BLM. During the period of implementation covered by this document, 208 plans will set forth Best Management Practices for Agricultural Activities including grazing. We recommend that BLM require best management practices at least as stringent as those recommended by the State.

A second inconsistency is the summary on page 3-18 which states that there would be no decrease in erosion resulting from the proposed range improvement program. If cover improves, erosion should decrease. This statement should be corrected or clarified.

The range trend in Table 2-10 is generally downward. If this is the case, how can increasing the amount of grazing be justified?

On page 2-24, it is stated that the ground water quality is slightly to moderately saline and figures of 1000 to 10,000 mg/l are given. The salinity limits given in the EPA publication "Quality Criteria for Water" which states that careful management practices are required for dissolved solids levels exceeding 1000 mg/l when water is used for irrigation. We would consider groundwaters with concentrations in excess of 2-3000 mg/l generally unsuitable for development except perhaps for livestock watering.

The range improvement program includes water developments. To what degree will these water developments affect local water supply and water quality?

According to our system for categorizing EIS's, this document has been rated LO-2. A description of our rating system will be included.

Sincerely yours,

Alan Merson
Regional Administrator

Enclosure

(23)

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

DEPT OF INTERIOR
BUREAU OF LAND MANAGEMENT
OFFICE OF THE DIRECTOR

'77 NOV 21 AM 7:30 RECEIVED
NOV 28 '77
BLM

November 17, 1977

Mr. Dale R. Andrus
State Director
Bureau of Land Management
Colorado State Bank Building
Room 700
Denver, Colorado 80202

Dear Mr. Andrus:

This is in response to your undated request for comments on the draft environmental statement (DES) for the proposed Uncompahgre Basin Resource Area Grazing Program, Montrose District, Colorado. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Council has determined that this DES does not demonstrate compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320). However, it appears that the Bureau of Land Management understands its responsibilities and will carry them out in the future.

Should you have any questions, please contact Brit Allan Storey of the Council staff at P. O. Box 25085, Denver, Colorado 80225, or at telephone number (303) 234-4946.

Sincerely yours,

Louis S. Wall
Assistant Director, Office
of Review and Compliance, Denver

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

GLOSSARY

ADJUSTMENTS IN NUMBERS. Change (increase or decrease) of livestock numbers to conform to the amount of forage produced in an area considering other multiple uses.

AESTHETICS. Dealing with the nature of the beautiful and with judgments concerning beauty.

ALLOTMENT. An area of land where one or more individuals graze their livestock. It generally consists of national resource lands but may include parcels of private or state owned lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture. In the ES area, an allotment may be in one geographical area and grazed under one grazing system, or it may include separate geographical tracts (allotment subunits) which are treated as a single management unit but grazed under separate grazing systems.

ALLOTMENT MANAGEMENT PLAN (AMP). A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific management goals in a grazing allotment.

ALLOTMENT SUBUNIT. See ALLOTMENT.

ALLUVIAL. Pertaining to or composed of any sediment deposited by flowing water (alluvium), as in a river bed.

ANASAZI. Prehistoric Indians who inhabited the Four Corners area, ca. A.D. 700-1300.

ANDESITE. A grey, fine-grained volcanic rock, chiefly plagioclase (mixtures of sodium and calcium aluminum silicates) and feldspar.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain the equivalent of one cow or five sheep for one month.

AQUATIC. Living or growing in or on the water.

AQUIFER. A water-bearing bed or stratum (layer) of permeable rock, sand, or gravel capable of yielding considerable quantities of water.

ARCHEOLOGICAL RESOURCES. Sites, areas, structures, objects, or other evidence of prehistoric human activities.

ASPECT. The orientation of a slope with respect to the compass; a position facing or fronting a particular direction.

BASALT. A fine-grained, dark-colored igneous rock of extrusive origin (derived from magma) and often having a glassy appearance.

BENTHIC ALGAE. Various primitive one-celled or multicellular plants living on the bottom (benthos) of a stream or lake.

BIOME. A community of living organisms (both plants and animals) of a single major ecological region and usually identified in terms of the characteristic vegetation.

BIOTYPE. All the organisms sharing a specified similarity, such as all the species of one genus.

BROWSE. As a verb, to consume or to feed on (a plant); as a noun, the tender shoots, twigs, and leaves of trees and shrubs, often used as food by cattle, deer, elk, and other animals.

CARNIVORE. A flesh-eating animal.

CARRYING CAPACITY. A maximum number of animals that can survive on a land area over a long term.

CENOZOIC. Belonging to or designating the latest era of geologic time, which includes the Tertiary and Quaternary periods and is characterized by the evolution of mammals, birds, plants, modern continents, and glaciation. Usually regarded as about 60 to 70 million years ago.

CHANGING SEASON OF USE. Adjusting the time of livestock grazing on range area based on type of vegetation or stage of vegetative growth.

CHANNEL. (First order, second order, etc.) See STREAM ORDER.

CHANNEL STABILITY. A relative term describing a channel's condition with respect to erosion or movement of the channel walls or bottom due to water flows.

CLASS OF LIVESTOCK. Kinds of domestic livestock grazing on a range: cattle, horses, sheep, goats, or a combination of these. May be broken down to greater detail, such as cows with calves, yearlings, steers, ewes, ewes with lambs, lambs, etc.

CLASS OF USE. The type and number of domestic animals that are allowed to graze on a specific unit of range, as designated by license.

CLIMAX VEGETATION. The final vegetative community which emerges after a series of successive vegetational stages and perpetuates itself indefinitely unless disturbed by outside forces.

COMMUNITY. A group of organisms which form a distinct ecological unit. Such a unit may be defined in terms of plants, animals, or both.

COMPACTION. The process of packing firmly and closely together; the state of being so packed.

CRITICAL WILDLIFE HABITAT. That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species, either as individuals or as a population.

CRUCIAL RANGE. Same as CRITICAL WILDLIFE HABITAT.

CULTURAL RESOURCES. A term that includes resources of historical, archeological, or architectural significance, which are fragile, limited, and nonrenewable portions of the human environment.

CUSTODIAL MANAGEMENT. Custodial management is a means of protecting the range resource on areas where the effect of livestock grazing on other resource values would be minimal and where multiple-use objectives can still be achieved with minimal expense. Livestock grazing use is authorized not to exceed the grazing capacity of the allotment, and the kind and number of livestock is specified along with the season of use. Custodial management includes trespass control.

DAKOTA SANDSTONE. Variously colored sedimentary rock composed predominantly of sandlike quartz grains cemented by lime, silica, or other materials, laid down during the late Cretaceous geologic period (135 million years ago) in western North America.

DEFERMENT. Withholding of livestock grazing until a certain stage of plant growth is reached, usually maturity of seed.

DEFERRED GRAZING. The discontinuance of livestock grazing on an area for a specified period of time during the growing season to promote plant reproduction, establishment of new plants, or restoration of vigor by old plants.

DEFERRED ROTATION GRAZING. The discontinuance of livestock grazing on various parts of a range in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor.

DEFOLIATE. To deprive (a tree or other plant) of leaves.

DENSITY. See VEGETATIVE DENSITY.

DIORITE. Any of various granite-textured, crystalline, dark rocks, rich in plagioclase (mixtures of sodium and calcium aluminum silicates) and having little quartz.

DISPERSED USE. Any type of recreational use which (1) has a high acreage requirement per person or family, e.g., fishing and hunting, or (2) can be enjoyed on a wide range of land types, e.g., picnicking, walking and driving for pleasure.

DISTRIBUTION. The uniformity of livestock grazing use over a range area. It is affected by water availability, topography, and type and palatability of vegetative species.

ECOLOGY. A study of animals and plants in their relation to each other and to their environment.

ECOSYSTEM. Complex self-sustaining natural system, which includes living and nonliving components of the environment, and the interactions that bind them together. Its functioning involves the circulation of matter and energy between organisms and their environment.

ENDEMIC. Confined to, or indigenous in, a certain region (in contrast with *exotic*). The normal population level of a potentially destructive species (in contrast with epidemic).

ELIMINATION OF GRAZING. Relinquishment or cancellation of livestock grazing use on lands currently being grazed by livestock.

ENVIRONMENT. The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

ENVIRONMENTAL ASSESSMENT REPORT (EAR). A concisely written record of environmental factors in land management actions.

ENVIRONMENTAL STATEMENT (ES). A written analysis of the impacts of a project (e.g., grazing program) on the environment.

EROSION. The group of natural processes including weathering, dissolution, abrasion, corrosion, and transportation by which earthy or rocky material is removed from any part of the earth's surface. (See PEDESTALLING, RILL EROSION, and SHEET EROSION.)

EROSION CONDITION CLASSES. Expression of current erosion activity using the following ratings (Soil Surface Factor): Stable—0-20; Slight—21-40; Moderate—41-60; Critical—61-80; Severe—81-100.

ESCAPE COVER. Those plants that provide an area where small mammals may escape from predators.

FAUNA. The animals of a particular period or region taken collectively.

FECAL SAMPLES. Samples of animal waste matter collected to make a determination of the type of foods eaten by the animal.

FLORA. The plants of a particular period or region taken collectively.

FLUVIAL. Formed or produced by the action of flowing water.

FORB. A broadleaved herb; a weed.

FREMONT CULTURE. Prehistoric Indians who inhabited the Great Basin area.

FREQUENCY OF USE. An expression of the periods of grazing use and nonuse describing how often and for how long grazing occurs.

FRY. Young, recently hatched fish, 1.5 to 2.0 inches in length, that are weak swimmers.

GLACIOFLUVIAL. Formed or produced by the action of moving glaciers and flowing water.

GRANITE. A coarse-grained, light-colored, hard igneous rock.

GRAZING SYSTEM. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple-use goals or objectives by improving the quality and quantity of the vegetation.

GRAZING TREATMENT. Under a rest rotation grazing system, grazing or resting a particular unit of land (usually a pasture) at particular times each year to attain particular vegetative goals.

GREEN PERIOD. When plants are green and growing.

HABITAT. A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

HABITAT REQUIREMENTS. Those items that an animal requires for proper life cycles and growth. See also LIMITING FACTORS.

HERBARIUM. A collection of dried plants mounted and labeled for use in scientific study; a place or institution where such a collection is kept.

HERBIVORE. A plant-eating animal.

HISTORICAL RESOURCES. Sites, districts, structures, objects, or other evidence of human activities that represent facets of the history of the nation, state, or locality; places where significant historical or unusual events occurred even though no evidence of the event remains; or places associated with a personality important in history.

HUMUS. Accumulated debris of plant stems, leaves, and roots forming the organic material in soils.

HYDRAULIC. Involving, moved, or operated by fluid, especially water, under pressure.

HYDRAULIC LENGTH. Length of the longest stream channel in a watershed.

HYDRAULIC POSITION. Position on a given slope.

HYDROGRAPHIC. Refers to the scientific description and analysis of the physical conditions, boundaries, flow, and related characteristics of oceans, lakes, rivers, and other surface waters.

HYDROLOGIC. Refers to the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere, and to their scientific study.

HYDROLOGIC SOIL GROUP. A class of soils which have similar general infiltration and water movement ability through the soil profile and bedrock.

IGNEOUS ROCK. Rock formed by solidification from a molten or partially molten state.

INFILTRATION. The flow of a liquid into a substance through pores or other openings; connotes flow into a soil, in contrast with PERCOLATION, which connotes flow through a porous substance. See also MOISTURE INFILTRATION.

INDUSTRY INCOME MULTIPLIER. Indicates how much income is stimulated into the economy of a region by an economic sector (e.g., government, agriculture), above and beyond the initial income produced by that sector.

INSECTIVORE. An insect-eating animal.

INTENSITY OF USE. Amount of vegetation consumed by grazing herbivores, usually measured as a percentage of the annual growth.

INTENSIVE USE. A relative term referring to (1) a recreational feature or land unit which could attract and sustain a high level of use in terms of visitor-days per unit area per year or (2) a type of recreational activity usually requiring a relatively small land area per person.

INTERMITTENT STREAM. A stream which has water only periodically during the year.

INTRUSIVE. Designating igneous rock forced into another stratum (layer) while in molten state.

INVADER. A plant species that was absent in the undisturbed portions of the original vegetation but that will become established there under conditions of disturbance or continued overuse.

INVERSION. An anomalous (abnormal) condition in the lower atmosphere in which temperature increases with increased elevation (normally temperature decreases with increased elevation).

INVERTEBRATE. An animal without a backbone. This group includes such animals as insects, clams, snails, and worms.

ION PAIR. A negative and a positive ion that are bonded together. (An ion is an atom, group of atoms, or molecule that has acquired a net electric charge by gaining electrons in or losing electrons from an initially electrically neutral configuration.)

KEY SPECIES. Plants that need the most rest to regain vigor after being grazed during the critical green period.

LAY-DOWN PANEL. Fencing constructed so that sections can be lowered from the vertical position when not needed, to prevent snow damage or permit passage of wildlife species.

LICENSE. An authorization which permits the grazing of a specified number and class of livestock on a designated area of national resource lands for a period of time, usually not in excess of one year.

LICENSED ACTIVE USE. Approximate amount of livestock forage actually produced on national resource lands in a given area.

LIMITING FACTOR. In proportion to the needs of an organism, the habitat requirement that is present in the minimum.

LITHIC SCATTER. Stone debris left as the result of tool manufacture or reshaping.

LITTER. The uppermost layer of organic debris. It is composed of freshly fallen or slightly decomposed organic materials.

LIVESTOCK OPERATION. The management of an area of land so that a significant portion of the income is derived from the continuing production of livestock.

MANAGEMENT FRAMEWORK PLAN (MFP). Land use plan for national resource lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

MANCOS SHALE. A dark fissile rock composed of laminated layers of claylike, fine-grained sediments, laid down during the late Cretaceous period (135 million years ago).

MAST. Nuts accumulated on the forest floor and serving as food for animals.

METAMORPHIC ROCK. Rock masses altered in composition, texture, or structure by great heat or pressure.

MICROHABITAT. The local habitat of an area of variable size.

MOISTURE INFILTRATION. Water penetration into the soil through pores of the soil. Rate and amount of infiltration is limited by size and abundance of pores and water absorption capability of the soil. See also INFILTRATION.

MULTIPLE USE. Harmonious and coordinated management of the various surface and subsurface resources, without impairment of the land, that will best meet the present and future needs of the people.

MULTIPLIER EFFECTS. The amount of additional income expected to be generated in all sectors of a regional economy as a result of an increase or decrease in income of the livestock sector.

NATIONAL REGISTER. The National Register of Historic Places, which is a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, and culture, maintained by the Secretary of the Interior.

NATIONAL RESOURCE LANDS (NRL). Public lands administered by the Bureau of Land Management.

NATURALISTIC LANDSCAPE. A situation where the basic elements (form, line, color, and texture) are displayed in composition that appears natural within the surrounding area or character type.

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

OMNIVORE. An animal which eats both animal and vegetable substances.

OROGENIC. Refers to the process of mountain building, especially by folding and faulting of the earth's crust.

OVERGRAZING. Consumption of vegetation by herbivores beyond the endurance of a plant to survive.

PALEOZOIC. One of the major eras of geologic time, lasting about 400 million years and believed to have begun at about the beginning of life on earth.

PARENT MATERIAL. The unconsolidated and more or less chemically weathered mineral or organic matter from which soil develops.

PASTURE. As used in this document, a subdivision of a grazing allotment on national resource lands.

PECKINGS. Rock art chipped or pecked into stone, as in a cliff face or boulder.

PEDESTALLING. A phenomenon of erosion where plants or rocks are left standing on pedestals of soil. Pedestals are formed because a rock or plant has held the soil underneath in place.

PERCOLATION, SOIL-WATER. The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

PERENNIAL STREAM. A stream which has water year-round.

PERMEABILITY. Capacity for transmitting a fluid. It is measured by the rate at which a fluid of standard viscosity can move through material in a given interval of time under a given hydraulic gradient.

PETROGLYPH. A rock carving, especially a prehistoric one.

PHOTOSYNTHESIS. The process by which green plants derive chemical energy from light and convert inorganic compounds to organic compounds.

PHENOLOGICAL NEEDS OF PLANTS. Requirements of vegetation to survive, the need to manufacture food, to replenish food reserves, to produce viable seed, and to have new seedlings become established.

PHYSIOLOGICAL NEEDS OF PLANTS. Same as PHENOLOGICAL NEEDS OF PLANTS.

PLEISTOCENE EPOCH. The Pleistocene epoch of the Quaternary geologic period, more familiarly known as the Ice Age, is generally considered to cover the last one million years. The Recent or Modern era is regarded by some as merely an interval in a Pleistocene era not yet ended.

PLANNING UNIT. A geographic unit within a Bureau of Land Management district which includes related lands, resources, and use pressure problems which are considered together for resource inventory and planning.

PLANT DENSITY. The number of individual plants per unit of area. Refers to the relative closeness of individual plants to one another.

PLANT GROWTH REQUIREMENTS. Similar to physiological needs of plants but more specific; pertains to requirements of soil for rooting, water, minerals, light, and air.

PLANT VIGOR. The relative well being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

POPULATION DYNAMICS. The rate at which a population is capable of reproducing itself.

PREDATOR. An animal that preys, devours, or destroys to live.

PREY. An animal taken by a predator as food.

PRIMITIVE AREA. Area in which no commercial development or use is permitted and no routes for motorized transportation are developed.

PUBLIC PARTICIPATION. A component of the Bureau of Land Management's planning system providing the opportunity for citizens as individuals or groups to review resource management proposals and offer their suggestions or criticisms for the various alternatives offered.

QUALIFICATIONS. Maximum grazing privileges (AUMs) on national resource lands attached to a livestock operator's private land.

RANGE ADJUDICATION. The allocation of grazing allotments, season of use, numbers and class of livestock to qualified livestock operators.

RANGE CONDITION AND TREND. A description of the current status and estimated future improvement or deterioration of the vegetation and soil.

RANGE IMPROVEMENT. A structure, action, or practice that increases forage production, improves watershed and range condition, or facilitates management of the range or the livestock grazing on it.

RAPTORS. An order of birds including all birds of prey, such as the eagle, hawk, owl, and vulture.

RECHARGE. Inflow to a ground water reservoir (aquifer system in which ground water is stored).

RECREATION OPPORTUNITIES (ACTIVITIES). A general categorization of leisure pursuits which occur in the outdoors.

RECREATION RESOURCES. Any natural resource or feature that contributes to outdoor leisure pursuits or experiences.

RELIEF. The variations in elevation of any area of the earth's surface.

RENEWABLE RESOURCES. All of the products and physical values produced or contained within national resource lands which could be restored or replenished as they are used (e.g., wildlife, vegetation, watershed). Does not include resources such as minerals, soils, cultural artifacts, which are gone once used or destroyed.

RESOURCES. All of the products and physical values produced or contained within the national resource lands, including natural resources, such as timber, coal, oil.

REST. As used in this statement, a grazing treatment under which no livestock are allowed to graze on a range area for one year, to allow plants to replenish their food reserves.

REST ROTATION GRAZING SYSTEM. A grazing system providing for systematic and sequential grazing by livestock and resting from livestock use on a range area to provide for the production of livestock while simultaneously maintaining or improving the vegetation and soil fertility.

RILL EROSION. Erosion in which numerous small channels of only several inches in depth are formed.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to the plants of all types that grow along streams, around springs, etc.

ROCKSHELTER. Any natural shelter between or under standing rocks in which the debris and campfires of prehistoric peoples are found.

ROTATION. A grazing system providing for sequential movement of livestock from one pasture to another to allow for regrowth of vegetation and maintenance of vegetative vigor.

SCHIST. Any of various medium to coarse-grained metamorphic rocks composed of laminated, often flaky, parallel layers of chiefly micaceous minerals.

SEASON-LONG GRAZING. For the purposes of this statement, grazing an area by livestock starting in May or June and ending in September or October; or grazing an area by livestock in the spring and fall with three or four months rest during the summer; or grazing an area by livestock in the spring only.

SEASON OF USE. The times of the year when domestic animals would be allowed to graze on a specific unit of range, as designated by license.

SEDIMENT. The relatively fine material that settles to the bottom of a waterway. Material less than three millimeters in diameter is of particular concern because of its adverse effects on aquatic life.

SEDIMENT YIELD. The average amount of soil moved from a given point to another point as a result of runoff.

SEDIMENTARY ROCKS. Rocks formed from sediment or from transported fragments deposited in water.

SEDIMENTATION. The action or process of deposition of material borne by water, wind, or glacier.

SEEDLINGS. Young plants.

SEED-RIPE STATE. When seed is mature, usually late summer and early fall.

SHEET EROSION. The removal of a layer of soil from land surface by water.

SINGLE USE POTENTIAL. The maximum production of a resource, such as forage, without environmental or policy constraints.

SOIL. The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and microorganisms, and topography, all acting over a period of time and producing a product that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. The immediate surface of the earth that serves as a natural medium for the growth of land plants.

SOIL ASSOCIATION. A group of defined and named taxonomic soil units occurring together in individual and characteristic patterns over a geographic region.

SOIL CLASSIFICATION. The systematic arrangements of soils into classes in one or more categories or levels of classification for a specific objective. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

SOIL PROFILE. Vertical section of the soil through the various layers of soil material. The layers are parallel to the land surface and differ in such characteristics as color and chemistry.

SOIL SURFACE FACTOR. Numerical ratings used to express current erosion activity. See EROSION CONDITION CLASSES.

STOCKING RATE. The degree to which a grazing unit is stocked with livestock, usually expressed in AUMs. The stocking rate may be more or less than the carrying capacity.

STREAM ORDER. (First order, second order, third order, etc.) A dimensionless number system introduced by Horton (1945) to quantify the branching hierarchy of stream networks. Assuming that one has available a channel network map including all intermittent and permanent flow lines located in clearly defined valleys, the smallest fingertip tributaries are designated order 1. Where two or more first order channels join, a channel segment of order 2 is formed. Where two segments of order 2 join, a segment of order 3 is formed, and so forth.

SUBSTRATE. A surface on which a plant or animal grows or is attached.

SUCCESSION. The progressive development of the vegetation towards its highest ecological expression (climax).

SUPPORTING MEASURES. Structures, actions, or practices where objectives or justifications are to increase forage production and utilization, to improve range conditions, or to facilitate management of the range or the livestock grazing on it; range improvements.

TAXONOMIC. Refers to the established scientific categories into which organisms are classified, such as families, species, and classes.

TERRESTRIAL. Living on or in or growing from land.

TERTIARY. The earlier of two geological periods comprising the Cenozoic era, usually regarded as about 70 million years of age.

TILTH. Surface soil as prepared for sowing or planting; the depth of friable (easily crumbled) earth.

TOPOGRAPHY. The exact physical features and configuration of a place or region; the detailed and accurate description of a place or region.

TRAILING USE. Movement of livestock through national resource lands (NRL), usually from one grazing land to another (whether private, Forest Service, or other NRL). The livestock graze as they are trailed.

TRESPASS CONTROL. Surveillance to ensure that the proper numbers of livestock are grazing in the right areas of use at the proper times of year.

UNALLOTTED LANDS. Lands which currently are not committed to livestock grazing use.

UNIT RESOURCE ANALYSIS (URA). A comprehensive display of physical resource data and an analysis of the current use, production, condition, and trend of the resources and the potentials and opportunities within a planning unit, including a profile of ecological values.

UTILIZATION. The proportion of current year's forage production that is consumed or destroyed by grazing animals, usually expressed as percentage. See also INTENSITY OF USE.

VARMINT. A wild animal or bird considered a pest.

VEGETATION CONVERSION. Replacing one vegetative type with another by means of chemical, mechanical, or some other treatment.

VEGETATIVE COMPOSITION. The proportion of the total vegetative density provided by each species, expressed in percent.

VEGETATIVE DENSITY. As viewed from above, the percent of ground cover for the current year's growth of all usable vegetation.

VISUAL RESOURCE MANAGEMENT CLASSES. Classification of landscapes according to the kinds of artificial structures and modifications which are acceptable to meet established visual goals.

VISUAL RESOURCES. The land, water, vegetation, animals, and other features that are visible on all national resource lands.

WATER TAP. A means of withdrawing water from an existing irrigation ditch or pipeline. A water right or permission to tap must be obtained prior to tapping.

WATERSHED. The region draining into a river, river system, or body of water.

WICKIUP. A frame hut covered with matting, bark, brush, or the like, used by the nomadic Indians of North America.

WINTER RANGE. That area occupied by a species during the winter months.

REFERENCES

Ambler, Richard J. 1969. The temporal span of the Fremont. *Southwestern Lore*. 34:4:107-117.

American Society of Civil Engineers. 1975. Watershed management. Proceedings of a symposium conducted by the Committee on Watershed Management of the Irrigation and Drainage Division of the ASCE, Logan, Utah, August 11-13, 1975.

American Society of Range Management, Range Term Glossary Committee. 1964. A glossary of terms used in range management.

Anderson, E. W., and Scherzinger, R. J. 1975. Improving quality of winter range for elk by cattle grazing. *Journal of Range Management*. 28:2:120-125.

Anderson, R. M. 1976. BLM memorandum, Montrose District, Montrose, Colorado.

Bachman, Roger Werner. 1958. The ecology of four north Idaho trout streams with reference to the influence of forest road construction. Master's thesis, University of Idaho.

Baker, M. F., and Frischknecht, N. C. 1973. Small mammals increase on recently cleared and seeded juniper rangeland. *Journal of Range Management*. 26:2:101-103.

Bear, G. D. 1973. Food habits of antelope. Final Job Report, Research Project No. W-40-R-13. Colo. Division of Wildlife.

Blackburn, W. H., and Skau, C. M. 1974. Infiltration rates and sediment production of selected plant communities in Nevada. *Journal of Range Management*. 27:476-480.

Boettcher, Arnold J. 1972. Groundwater occurrence in northern and central parts of Western Colorado. Colorado Water Resources, Circular 15, Colorado Water Conservation Board, Denver.

Boussu, M. F. 1954. Relationships between trout populations and cover on a small stream. *Journal of Wildlife Management*. 18(2):229-239.

Branson, F. A.; Gifford, G. G.; and Owen, J. R. 1972. Rangeland hydrology. Society for Range Management. Denver, Colorado.

Branson, F. A.; Miller, R. F.; and McQueen, I. S. 1966. Contour furrowing, pitting, and ripping on rangelands of the western United States. *Journal of Range Management*. 19:182-190.

Breternitz, David A. 1973. Report of inventory of Indian ruins located in the probable flood area of the proposed Ridgway Dam and Reservoir, and relocation of U.S. Highway 550. NPS Contract 2920P20079. Unpublished MS on file in Montrose District Office.

Breternitz, David A., and Breternitz, Cory D. 1975. Cultural resources recorded for the proposed BLM chaining areas (Paonia and Hotchkiss) and the Los Pinos timber sale. Unpublished MS on file in Montrose District Office.

Breternitz, David A.; Carpenter, Scott L.; Gillespie, William G.; and Stiger, Mark A. 1974. Inventory of archaeological resources, Black Canyon of the Gunnison National Monument, Colorado. Unpublished MS on file in Montrose District Office.

Breternitz, David A., and Williams, Paul R. 1976. Cultural resources recorded for the BLM Fall 75 Montrose Project. Unpublished MS on file in Montrose District Office.

Brown, H. E. 1970. Status of pilot watershed studies in Arizona. American Society of Civil Engineers. Proceedings of the Irrigation and Drainage Division (Paper 7952). 97:93-108.

Buckhouse, John C., and Gifford, Gerald F. 1976. Grazing and debris burning on pinyon-juniper sitessome Chemical water quality implications. *Journal of Range Management*. July 1976, 29(4).

Buckles, William G. 1968. Archaeology in Colorado: historic tribes. *Southwestern Lore*. 34:3:53-67

———. 1971. The Uncompahgre Complex: historic Ute archaeology and prehistoric archaeology on the Uncompahgre Plateau in west central Colorado. Unpublished Ph.D dissertation, University of Colorado.

Burt, W. H., and Grossenheider, R. P. 1964. *A field guide to the mammals*. Boston: Houghton Mifflin Co.

Carpenter, Scott L., and Stiger, Mark A. 1975. Archaeological inventory of the Dallas Creek project. Unpublished MS on file in Montrose District Office.

Colorado Department of Agriculture. 1975. Colorado Agricultural Statistics. 1974 preliminary and 1973 final.

Colorado Division of Wildlife. 1974. The strategy of today for wildlife tomorrow.

Colorado State Department of Health, Air Pollution Control Division. n.d. Hi-Vol Network Sampling Data.

Colorado State Department of Health, Colorado Water Quality Control Commission. 1974. Water quality standards and stream classification.

Colorado State Department of Health, Records and Statistics Section. 1975. Demographic profile, Colorado Planning and Management District 10, March 1975.

Colorado State Department of Highways. 1972. Traffic volume map, Colorado state highway system. Prepared by State Department of Highways and State of Colorado Planning and Research Division in cooperation with U.S. Department of Transportation, Federal Highway Administration.

Colorado State Department of Local Affairs, Division of Planning. 1976. Colorado population projections 1970-2000, April 1976.

Colorado State Department of Local Affairs, Division of Property Taxation. 1975. Fifth annual report to the governor and legislature.

Colorado Land Use Commission. 1974. Colorado land use. Map folio, sediment yield, 1:500,000 scale. Denver, Colorado.

Cook, Wayne. 1971. Effects of season and intensity of use on desert vegetation. Utah Agricultural Experiment Station, Bulletin 483. Utah State University.

Cooper, A. C. 1956. A study of the Horsefly River and the effect of placer mining operations on sockeye spawning grounds. International Pacific Salmon Fishing Commission Publication 3:1-58.

Cordone, Almo J., and Kelley, Don W. 1961. The influences of inorganic sediment on the aquatic life of streams. California Fish and Game. 47(2):189-228.

Council on Environmental Quality. 1973. Environmental quality.

———. 1974. Environmental quality.

Dasmann, R. F. 1964. *Wildlife biology*. New York: John Wiley and Sons, Inc.

DeBloois, Evan; Green, Dee; and Wylies, Henry. 1974. A test of the impact of pinyon-juniper chaining on archeological sites. Archeological Reports, Intermountain Region. U.S. Department of Agriculture, Forest Service.

Douglas, L. H. 1915. Deferred and rotation grazing, Hayden National Forest, Wyoming. *National Woolgrower*. 5(10):11-14.

Eckert, R. D. 1975. Improvement of mountain meadows in Nevada. Bureau of Land Management Research Report.

Edwards, R. Y., and Fowle, C. D. 1955. The concept of carrying capacity. In *Readings in Wildlife Conservation*, ed. J. A. Bailey, W. Elder, and T. D. McKinney, pp. 353-359. Washington, D.C.: The Wildlife Society, 1974.

Environmental Protection Agency. 1973. Methods for identifying and evaluating the nature and extent of nonpoint sources of pollutants. 430/9-73-014.

Errington, P. L. 1956. Factors limiting higher vertebrate populations. In *Readings in Wildlife Conservation*, ed. J. A. Bailey, W. Elder, and T. D. McKinney, pp. 167-175. Washington, D.C.: The Wildlife Society, 1974. Federal Register. 1976. Vol. 41, No. 117, Part IV, June 16, 1976. Washington, D. C.

Flinders, J. T., and Hansen, R. M. 1975. Spring population responses of cottontails and jackrabbits to cattle grazing shortgrass prairie. *Journal of Range Management*. July 1975, 28(4):290-293.

Frischknecht, N. C. 1975. Native faunal relationships within the pinyon-juniper ecosystem. Proceedings of Pinyon-Juniper Symposium, Utah State University. Pg. 55-65.

Gamon, James R. 1970. The effect of inorganic sediment on stream biota. Environmental Protection Agency, Water Quality Office, Water Pollution Control Research Service. 18050 DWCR/70.

Garrison, George A. 1972. Carbohydrate reserves and response to use. In *Wild Shrubs—Their Biology and Utilization*, ed. C. M. McKell et al. General Technical Report INT-1, August 1972. Intermountain Forest and Range Experiment Station, Ogden, Utah. U. S. Department of Agriculture, Forest Service.

Gersing, F. M. 1975. Waterfowl production in relation to rest-rotation grazing. *Journal of Range Management*. 28:1:37-42.

Gifford, G. F. 1972. Infiltration rate and sediment production trends on a plowed big sagebrush site. *Journal of Range Management*. 25:53-55.

———. 1975. Beneficial and detrimental effects of range improvement practices on runoff and erosion. Proceedings of a symposium conducted by the Irrigation and Drainage Division of the American Society of Civil Engineers. Pp. 216-248.

Gifford, G. F., and Busby, F. E. 1974. Intensive infiltrometer studies on a plowed big sagebrush site. *Journal of Hydrology*. 21:81-90.

Gifford, G. F., and Hawkins, Richard H. 1976. Grazing systems and watershed management look at the record. *Journal of Soil and Water Conservation*. Sept.-Oct.

Gifford, G. F.; Hawkins, R. H.; and Williams, J. S. 1975. Hydrologic impacts of livestock grazing on national resource lands in the San Luis Valley. Completion report to the Bureau of Land Management by the Utah State University Foundation.

Gifford, G. F., and Skau, C. M. 1967. Influence of various rangeland cultural treatments on runoff and sediment production from the big sagebrush type, Eastgate Basin, Nevada. Proceedings of the Third American Water Resource Conference, San Francisco, Nov. 8-10, 137-148.

Gifford, R. O.; Ashcroft, G. L.; and Magnuson, M. D. 1967. Probability of selected precipitation amounts in the western region of the United States. Research Publication T-8. Agricultural Experiment Station. University of Nevada, Reno.

Goldman, Marshall I. 1967. *Controlling pollution, the economics of a cleaner America*. Englewood Cliffs, N. J.: Prentice-Hall Inc.

Gross, J. E. 1969. Optimum yield in deer and elk populations. In *Readings in Wildlife Conservation*, ed. J. A. Bailey, W. Elder, and T. D. McKinney, pp. 669-680. Washington, D.C.: The Wildlife Society, 1974.

Gunderson, Donald R. 1968. Floodplain use related to stream morphology and fish populations. *Journal of Wildlife Management*. 32:3:507-514.

Hansen, Richard M. 1975. Report of microhistological estimates of ruminant food habits of deer, elk, horses, cattle and antelope in the Challis Planning Unit. Special Report.

Hansen, R. M., and Reid, L. D. 1975. Diet overlap of deer, elk, and cattle in southern Colorado. *Journal of Range Management*. 28:1:43-47.

Hill, R. R.; Hunter, G. N., McCain, R.; Robinette, W. L.; Taylor, W. P.; and Yeager, L. E. 1956. *In The Deer of North America*, ed. W. P. Taylor, pp. 391-414. Harrisburg, Penn.: The Stockpole Company.

Hoover, R. L.; Till, C. E.; and Ogilvie, S. 1959. The antelope of Colorado. Colorado Division of Wildlife Technical Bulletin No. 4.

Hormay, August L. 1970. Principles of rest-rotation grazing and multiple-use land management. U.S. Department of Agriculture, Forest Service. September 1970.

Hurst, Blanche H. 1957. A comparative study of the peripheral excavations of C. T. Hurst. *Southwestern Lore*. 23:2:15-31.

Hurst, W. D. 1976. Management strategies within the pinyon-juniper ecosystem. *Rangeman's Journal*. February 1976, 3(1):5-7.

Huscher, Betty H., and Huscher, Harold A. 1940. Conventionalized bear-track petroglyphs of the Uncompahgre Plateau. *Southwestern Lore*. 6:2:23-26.

———. 1943. The hogan builder of Colorado. *Southwestern Lore*. 9:22:1-92.

Huscher, Harold A. 1939. Influence of the drainage pattern of the Uncompahgre Plateau on the movements of primitive peoples. *Southwestern Lore*. 5:2:22-41.

Iorns, W. V.; Hembree, C. H.; and Oakland, G. L. 1965. Water resources of the upper Colorado River basin. Technical Report, Research Paper 441. U.S. Department of Interior, Geological Survey.

Jennings, Calvin H. 1968. The paleo-Indian and archaic stages in western Colorado. *Southwestern Lore*. 34:1:11-30.

Johnson, W. M. 1965. Principles of rotation, rest rotation, and season-long grazing in a mountain range in Wyoming. Rocky Mountain Forest and Range Experimental Station, Research Paper RM-14. U.S. Department of Agriculture, Forest Service.

Jordan, D. S. 1891. Report of the explorations in Colorado and Utah during the summer of 1889, with an account of the fishes found in each of the river basins examined. Bulletin of U.S. Fisheries Commission. 9:1-40.

Keng, E. B., and Merrill, Leo B. 1960. Deferred rotation grazing does pay dividends. *Sheep and Goat Raiser*. June, 1960.

Kent, K. M. 1968. A method for estimating volume and rate of runoff in small watersheds. SCS-TP-149. U.S. Department of Agriculture, Soil Conservation Service.

King, R. T. 1938. The essentials of a wildlife range. In *Readings in Wildlife Conservation*, ed. J. A. Bailey, W. Elder, and T. D. McKinney, pp. 335-341. Washington, D.C.: The Wildlife Society, 1974.

Koford, C. B. 1958. Prairie dogs, whitefaces, and blue grama. Wildlife Monograph No. 3. The Wildlife Society.

Kynes, H. B. N. 1970. *The ecology of running waters*. University of Toronto Press.

Langbein, W. B., and Schumm, S. A. 1958. Yield of sediment in relation to mean annual precipitation. American Geophysical Union, Trans. 39:1076-1084.

Leopold, A. S. 1966. Adaptability of animals to habitat change. In *Readings in Wildlife Conservation*, ed. J. A. Bailey, W. Elder, and T. D. McKinney, pp. 149-159. Washington, D.C.: The Wildlife Society, 1974.

Lister, Robert H., and Sandburg, Monte. 1963. Artifacts from the Hauser Site, Montrose, Colorado. *Southwestern Lore*. 28:4:61-72.

Litzinger, William. 1975. Effects of sheep grazing on the Hovenweep environment. Unpublished MS on file at Mesa Verde National Park.

Martin, A. C.; Zim, H. S.; and Nelson, A. L. 1951. *American wildlife and plants: A guide to wildlife food habits*. New York: Dover Publications, Inc.

Martin, S. Clark. 1973. Responses of semidesert grasses to seasonal rest. *Journal of Range Management*. 26:2:165-170.

———. 1975. Ecology and management of southwestern semidesert grass-shrub ranges. U.S. Department of Agriculture, Forest Service Research Paper RM 156.

McConnell, W. J. 1968. Limnological effects of organic extracts of litter in southwestern impoundment. *Limnology and Oceanography*. 13(2):343-349.

McKean, W. T., and Baker, B. D. 1972. Wildlife management unit 62 (E. Uncompahgre). Colorado Division of Wildlife.

McKean, W. T., and Bartman, R. W. 1971. Deer-livestock relations on a pinyon-juniper range in northwestern Colorado. Final report, Federal Aid in Wildlife Restoration, Project W-101-R. Colorado Division of Wildlife.

McLean, A., and Tisdale, E. W. 1972. Recovery rate of depleted range sites under protection from grazing. *Journal of Range Management*. May 1972, 25(3): 178-184.

Meeuwig, R. O. 1965. Effects of seeding and grazing on infiltration capacity and soil stability of a subalpine range in central Utah. *Journal of Range Management*. 18:173-180.

Miller, J. F.; Frederick, R. H.; and Tracey, R. J. 1973. Precipitation frequency atlas of the western United States. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service. NOAA Atlas 2, Vol. 3, Colorado. Silver Springs, Maryland.

Minckley, W. L. 1963. The ecology of a spring stream, Doe Run, Meade Co., Kentucky. Wildlife Monographs 11.

Needham, Paul R. 1969. *Trout streams*. San Francisco, Calif.: Holden-Day.

Orr, H. K. 1957. Effects of plowing and seeding on some forage production and hydrologic characteristics on a subalpine range in central Utah. Intermountain Forest and Range Experimental Station. Research Paper 47.

Pase, C. P., and Ingebo, P. A. 1965. Burned chaparral to grass: early effects on water and sediment yields from two granitic soil watersheds in Arizona. Annual Arizona Water Symposium Proceedings. 9:8-11.

Peters, John C. 1965. The effects of stream sedimentation on trout embryo survival. Seminar on Biological Problems in Water Pollution. US PHEW, PHS.

Peterson, Kenneth Lee. 1970. The distribution of high mountain archaeological sites in relation to past and present timber line resources. *Student Anthropologist*. 2:2:1-6.

Phillips, Robert W. 1971. Effects of sediment on gravel environment and fish production. Proceedings of a symposium on forest land uses and stream environment, October 19-21, 1970.

Platts, W. S., and Rountree, C. 1972. Bear Valley, Idaho, aquatic environment and fisheries study. U.S. Forest Service publication. Mimeo.

Ponce, S. L.; Hawkins, R. H.; Jurinak, J. J.; Gifford, G. F.; and Riley, J. R. 1975. Surface runoff and its effect on diffuse salt production from Mancos shale members. Watershed management: Proceedings of a symposium conducted by the Irrigation and Drainage Division of the American Society of Civil Engineers, Logan, Utah, August 11-13, 1975. Pp. 140-168.

Price, Don, and Waddell, K. M. 1973. Selected hydrologic data in the upper Colorado River basin. Hydrologic Investigations Atlas HA-477. U.S. Department of the Interior.

Ratliff, Raymond D.; Reppert, Jack N.; and McConnen, Richard J. 1972. Rest rotation grazing at Harvey Valley. U.S. Department of Agriculture, Forest Service Research Paper TFW 77.

Ratzloff, James. 1976. Endangered and Threatened plants of the Uncompahgre Resource Area. Unpublished MS on file in Montrose District Office.

Renner, F. G. 1936. Conditions influencing erosion on the Boise River watershed. U.S. Department of Agriculture Technical Bulletin 528.

Ross; Blood; and Nobe. 1975. A survey of sportsmen expenditures for hunting and fishing in Colorado. Contract report for the Colorado Division of Wildlife. Colorado State University, Department of Economics.

Sarnoff, Paul. 1971. *Encyclopedic dictionary of the environment*. New York: Quadrangle Books.

Schroeder, Albert H. 1953. Statement on the early history and archaeology of the Gunnison River basin. *Southwestern Lore*. 19:3:-11.

———. 1964. The cultural position of Hurst's Tabegauche caves and pueblo sites. *Southwestern Lore*. 29:4:77-79.

Schultz, Robert W. 1973. Snowmelt lysimeters perform well in cold temperatures in central Colorado. Research Note RM-247. U.S. Department of Agriculture, Forest Service.

Shepherd, Harold R. 1971. Effects of clipping on key browse species in southwestern Colorado. State of Colorado, Division of Game, Fish, and Parks. Technical Publication No. 28.

Smith, Allen. 1966. A Lake Mohave point from the Uncompahgre Plateau. *Southwestern Lore*. 32:1:23-24.

Stoddart, Laurence A., and Smith, Arthur D. 1955. *Range management*. New York: McGraw Hill Book Co.

Tebo, L. B. 1974. Review of selected parameters of trout stream quality. Symposium of Trout Habitat Research and Management. Boone, North Carolina: Consortium Press.

Thomas, D. B. 1975. The effects of gully plugs and contour furrows on erosion and sedimentation in Cisco Basin, Utah. Unpublished master's thesis, Utah State University.

Tueller, P. T., and Monroe, L. A. n.d. Management guidelines for selected deer habitats in Nevada. Publication No. 104. University of Nevada in cooperation with Bureau of Land Management and Nevada Department of Fish and Game.

U.S. Department of Agriculture. n.d. Effects of cattle grazing on ponderosa pine-bunchgrass range in the Pacific Northwest. Technical Bulletin No. 1531, pp. 15-29.

U.S. Department of Agriculture, U.S. Forest Service. 1973 and 1974. National forest landscape management. Volumes 1 and 2. Agriculture Handbooks No. 434 and No. 462

U.S. Department of Agriculture, U.S. Forest Service, Soil Conservation Service. 1962. Water and related land resources, Gunnison River Basin, Colorado.

U.S. Department of Agriculture, Soil Conservation Service. 1972a. Geology, procedures for computing sheet and rill erosion on project area. No. 51.

———. 1972b. SCS national engineering handbook. Section 4, Hydrology.

———. 1974. Snow frequency analysis for Colorado and New Mexico. Denver, Colorado.

———. 1975. Natural resource plan, Planning and Management Region 10. Ute Lands RC and D Council.

U.S. Department of Agriculture, Weather Bureau. 1933. Climatic summary of the United States. Section 22, western Colorado.

U.S. Department of Commerce. n.d. Air pollutant impact analysis. Chapter 6 and appendix of a study of the economic, social, and environmental consequences of sharply increased energy related development in Colorado Managing and Planning Regions 10 and 11. Sponsored by

U.S. Department of Commerce, Economic Development Administration. Principal investigators Bernard Udis, Charles W. Howe, and Jen F. Krider. Unpublished draft.

U.S. Department of Commerce, Regional Economics Information System, Bureau of Economic Analysis. n.d. Personal income by major source, 1970-74.

U.S. Department of the Interior, Bureau of Land Management. n.d.(a). BLM Manual, 6300 series.

———. n.d.(b). A social-economic profile of the Black Canyon region. Montrose, Colorado.

———. n.d.(c). Socio-Economic data-income, 1973.

———. 1970a. Pronghorn antelope. BLM Manual Technical Supplement 6601-1, Rel. 6-20.

———. 1970b. Sage Grouse. BLM Manual Technical Supplement 6601-3, Rel. 6-23.

———. 1971-1974. Public attitudes. Delbecq Nominal Group. Montrose District 1971-1974.

———. 1974. Mule Deer. BLM Manual Technical Supplement 6601-6, Rel. 6-46.

———. 1975. Phase I watershed survey for Uncompahgre Resource Area. Unpublished MS on file in Montrose District Office.

———. 1976a. Cimarron management framework plan. Unpublished report prepared by the Montrose District Office.

———. 1976b. Escalante management framework plan. Unpublished report prepared by the Montrose District Office.

———. 1976c. Gunnison Gorge management framework plan. Unpublished report prepared by Montrose District Office.

———. 1976d. North Fork management framework plan. Unpublished report prepared by the Montrose District Office.

———. 1976e. Unit resource analysis for Cimarron planning unit. Unpublished report prepared by the Montrose District Office.

———. 1976f. Unit resource analysis for Escalante planning unit. Unpublished report prepared by Montrose District Office.

———. 1976g. Unit resource analysis for Gunnison Gorge planning unit. Unpublished report prepared by Montrose District Office.

———. 1976h. Unit resource analysis for North Fork planning unit. Unpublished report prepared by the Montrose District Office.

U.S. Department of the Interior, Bureau of Reclamation, 1976. Dallas Creek project, Colorado. INT DES 76-11.

U.S. Department of the Interior, Fish and Wildlife Service. 1975. Threatened or endangered fauna or flora. Federal Register. Vol. 40, No. 127, p. 27846.

———. 1976. Field draft of report of fish and wildlife resources in relation to the Dallas Creek Project. Unpublished, 1974, mimeographed.

U.S. Geological Survey. 1971. Effects of grazing on the hydrology and biology of the Badger Wash Basin in western Colorado, 1953-66. Water Supply Paper 1532-D.

Vallentine, J. F. 1971. *Range developments and improvements*. Provo, Utah: Brigham Young University.

White, R. J. 1973. Stream channel suitability for coldwater fish. Proceedings of the annual meeting of the Soil Conservation Society of America. Hot Springs, Arkansas.

Weins, J. A., and Dyer, M. I. 1975. Rangeland avifaunas: their composition, energetics and role in the ecosystem. Presented at Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, May 6-9, 1975.

Williams, Burton D. 1975. The U.S. national forest archaeology program in Colorado. *Southwestern Lore*. 41:4:8-10.

Wormington, H. M., and Lister, Robert H. 1956. Archaeological investigations on the Uncompahgre Plateau in west central Colorado. Proceedings No. 2, The Denver Museum of Natural History.

Wright, H. A. 1972. Shrub response to fire. In *Wildland Shrubs—Their Biology and Utilization*, ed. C. M. McKell et al. General Technical Report INT-1, August 1972. U.S. Department of Agriculture, Forest Service.

Zimmer, Robert. 1976. Personal communication.

ERRATA

1. The legend on the proposed projects map should indicate that

   a. The brown outlines with brown, four-digit numbers (e.g., 4529, 5002) indicate proposed allotments
   b. The brown outlines with brown one-digit and two-digit numbers indicate unallotted tracts

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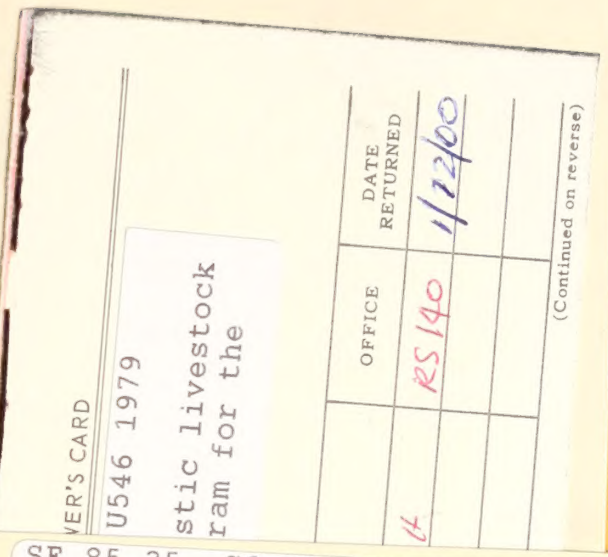

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Proposed domestic livestock
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T. 49 N.
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EXISTING PROJECTS

- Roads
- Boundary Markers
- Corral
- Stock Trail
- Well
- Pipeline
- Pit
- Spring
- Troughs
- Reservoirs
- Storage Tanks
- Catchment
- Water Tap
- Bridge
- Check Dams
- Chainings
- Seeding
- Chaining & Seeding

MAP SYMBOLS

Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Bdy.		Road All Weather	Divided	Principal Access	Divided	Buildings		Towns and Cities	
Nat'l. or State		Road Seasonal Use				Buildings (Abandoned)		River or Large Stream	
		Road Jeep Type Primitive		Road Interchange		BLM Office		Stream	
Continental Divide		Trail		Rest Area		School		Large Dam	
County		Railroad Double Track				Church		Reservoir or Retention Dam	
Land Grant		Railroad Single Track				Radio Installation		Lake or Pond	
Miscellaneous (Trail, etc.)		Glacier		Levee or Dike		Fire Lookout (Primary)		Intermittent Lake or Pond	
Park, Forest, County or Local		Road Bridge		Corral		Fire Lookout (Secondary)		Dry Lake or Pond	
Township and Range	Surveyed / Protracted	Railroad Bridge		Recreation Site		Fire Tool Cache		Marsh	
Section	Surveyed / Protracted	Foot Bridge		Tanks-(label as to type)		Shelter		Spring	
Sec., Status Subdivision		Ferry		Oil or Gas Well		Cliff Dwelling		Improved Spring	
Section Identification	6	Road Ford		Mine or Quarry		Ruins, Small / Large	Ruins / Ruins	Well	
State Plane Coordinates and Tens	1,500,000E	Trail Ford		US Mineral or Location Monument		Cemetery	CEM	Artesian Well	
Boundary Monument		Road Tunnel		Located (Quartz/Lode)		Sawmill		Windmill	
Route Marker Interstate		Railroad Tunnel		Triangulation Station	Dog	Airfield		Aqueduct Tunnel	
Route Marker U.S.				Bluffs or Cliffs				Ditch or Canal	
Route Marker State		Prominent Pass		Prominent Ridge		Gaging Station		Aqueduct	

SOURCE OF INFORMATION: OFFICE OF SPECIAL MAPPING, DENVER SERVICE CENTER, AND OTHER BLM RECORDS

U.S. DEPARTMENT OF THE INTERIOR
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UNCOMPAHGRE BASIN RESOURCE AREA

SOUTH HALF
COLORADO
1977

LAND STATUS LEGEND

- National Forest
- Public Lands
- State Lands
- Bureau of Reclamation
- Power Withdrawals and Classifications
- Federal Agency Protective Withdrawals
- Public Water Reserves

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EXISTING PROJECTS

- Roads
- Boundary Markers
- Corral
- Stock Trail
- Well
- Pipeline
- Fence
- Spring
- Troughs
- Reservoirs
- Storage Tanks
- Catchment
- Water Top
- Bridge
- Check Dams

- Contour Furrows
- Chainings
- Seeding
- Chaining & Seeding
- Sprayed Area

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
UNCOMPAHGRE BASIN RESOURCE AREA

NORTH HALF
COLORADO
1977

SCALE
1 ½ 0 1 2 3 4 5 MI

LAND STATUS LEGEND

- Public Lands
- National Forest
- State Lands
- National Parks and Monuments
- Bureau of Reclamation
- Power Withdrawals and Classifications
- Federal Agency Protective Withdrawals
- Public Water Reserves

MAP SYMBOLS

Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Bdy		Road All Weather		Divided / Principal Access		Divided		Buildings		Towns and Cities	
Nat'l or State		Road Seasonal Use						Buildings (Abandoned)		River or Large Stream	
		Road "Jeep" Type Primitive		Road Interchange		BLM Office		Stream	
Continental Divide		Trail		Rest Area		School		Large Dam	
County		Railroad Double Track				Church		Reservoir or Relation Dam	
Land Grant		Railroad Single Track				Radio Installation		Lake or Pond	
Miscellaneous Bdy., etc.		Glacier		Levee or Dike		Fire Lookout (Primitive)		Intermittent Lake or Pond	
Park (State, County or Local)		Road Bridge		Corral		Fire Lookout (Standard)		Dry Lake or Playa	
Township and Range	Surveyed / Protracted	Railroad Bridge		Recreation Site		Fire Tool Cache		Marsh	
Section	Surveyed / Protracted	Foot Bridge		Tanks (Water in it type)		Shelter		Spring	
Sec., Status Subdivision		Ferry		Oil or Gas Wells		Cliff Dwelling		Improved Spring	
Section Identification	6	Road Ford		Mine, or Quarry		Ruins, Small / Large	Ruins	Well	
State Plane Coordinates And Zone	1,000,000E	Trail Ford		US Mineral or Landsite Monument		Cemetery	CEM	Artesian Well	
Boundary Monument		Road Tunnel		Limited Open Lands		Summit		Windmill	
Route Marker Interstate		Railroad Tunnel		Triangulation Station	Obs	Airfield		Aqueduct Tunnel	
Route Marker U.S.				Bluffs or Cliffs				Ditch or Canal	
Route Marker State		Prominent Peak		Prominent Ridge		Gaging Station		Aqueduct	

U.S. DEPARTMENT OF THE INTERIOR
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UNCOMPAHGRE BASIN RESOURCE AREA

SOUTH HALF
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PROPOSED PROJECTS

- Roads
- Boundary Markers
- Corral
- Stock Trail
- Well
- Pipeline
- Fence
- Spring
- Troughs
- Reservoirs
- Storage Tanks
- Catchment
- Water Top
- Bridge

Chaining & Seeding

Furrow

Includes one Trough, for each mile of pipeline and for each reservoir, spring, catchment, well, etc.

MAP SYMBOLS

Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Boy		Road An Maintn.		Divided		Principal Access		Buildings		Towns and Cities	
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State Plane Coordinates and Zone		Road Ford		Mine or Quarry				Ruins Large / Small	Ruins / Ruins	Well	
Boundary Monument	1,500,000 E	Trail Ford		US Mineral or Location Monument				Cemetery	CEM	Artesian Well	
Route Marker Interstate		Road Tunnel		Located Object (Labeled)				Sawmill		Windmill	
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UNCOMPAHGRE BASIN RESOURCE AREA

SOUTH HALF
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LAND STATUS LEGEND

National Forest	Bureau of Reclamation
Public Lands	Power Withdrawals and Classifications
State Lands	Federal Agency Protective Withdrawals
	Public Water Reserves

SCALE 1 ½ 0 1 2 3 4 5 Mi

N

R. 2 E. R. 98 W. R. 97 W. R. 96 W. R. 95 W. R. 94 W. R. 93 W. R. 8 W. R. 7 W. R. 6 W. R. 5½ W. R. 5 W. R. 4 W. R. 3 W.

T. 49 N. T. 48 N. T. 47 N. T. 46 N. T. 45 N. T. 44 N. T. 44 N. T. 43 N. T. 42 N. T. 41 N.

Bureau of Land Management
Library
Denver Service Center

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

PROPOSED PROJECTS

- Roads
- Boundary Markers
- Corral
- Stock Trail
- Well
- Pipeline
- Fence
- Spring
- Troughs
- Reservoirs
- Storage Tanks
- Catchment
- Water Top
- Bridge

Chaining & Seeding

Furrow

Includes one Trough, for each mile of pipeline and at each reservoir, spring, catchment, well, etc.

UNCOMPAHGRE BASIN RESOURCE AREA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NORTH HALF
COLORADO
1977

SCALE
1 ½ 0 1 2 3 4 5 MI

LAND STATUS LEGEND

- Public Lands
- National Forest
- State Lands
- National Parks and Monuments
- Bureau of Reclamation
- Power Withdrawals and Classifications
- Federal Agency Protective Withdrawals
- Public Water Reserves

MAP SYMBOLS

Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Bdy		Road All Weather		Principal Access		Buildings		Towns and Cities	
Natl or State		Road Seasonal Use				Buildings (Abandoned)		River or Large Stream	
		Road Jeep Type Primitive		Road Interchange		BLM Office		Stream	
Continental Divide		Trail		Rest Area		School		Large Dam	
County		Railroad Double Track				Church		Reservoir or Retention Dam	
Land Grant		Railroad Single Track				Radio Installation		Lake or Pond	
Miscellaneous (Mex., etc.)		Glacier		Levee or Dike		Fire Lookout (Primary)		Intermittent Lake or Pond	
Road (State, County or Local)		Road Bridge		Corral		Fire Lookout (Secondary)		Dry Lake or Pond	
Township and Range	Surveyed / Protracted	Railroad Bridge		Recreation Site		Fire Tool Cache		Marsh	
Section	Surveyed / Protracted	Foot Bridge		Tanks (Water or Oil Type)		Shelter		Spring	
Sec., Ditches Subdivision		Ferry		Oil or Gas Wells		Cliff Dwelling		Improved Spring	
Section Identification	6	Road Ford		Mine or Quarry		Ruins Small / Large	Ruins	Well	
State Plane Coordinates And Courses	1,500,000 E	Trail Ford		US Mineral Survey Mon.		Cemetery	CEM	Artesian Well	
Boundary Monument		Road Tunnel		Located Object (Labeled)		Sawmill		Windmill	
Route Marker Interstate		Railroad Tunnel		Triangulation Station		Airfield		Aqueduct Tunnel	
Route Marker U.S.				Bluffs or Cliffs				Ditch or Canal	
State Marker State		Prominent Peak		Prominent Ridge		Gaging Station		Aqueduct	

ISLAND ACRES STATE RECREATION AREA

COLORADO DIVISION OF WILDLIFE
ESCALANTE WILDLIFE AREA

COLORADO DIVISION OF WILDLIFE
BAPINERO WILDLIFE AREA

CRAWFORD STATE RECREATION AREA

GRAND MESA NATIONAL FOREST

GUNNISON NATIONAL FOREST

MONTROSE

DELTA

MESA COUNTY

GUNNISON COUNTY

SAN MIGUEL COUNTY

OURAY COUNTY

R. 100 W. R. 99 W. R. 98 W. R. 97 W. R. 96 W. R. 95 W. R. 94 W. R. 93 W. R. 92 W. R. 91 W. R. 90 W. R. 89 W. R. 88 W. R. 87 W.

T. 10 S. T. 11 S. T. 12 S. T. 13 S. T. 13 S. T. 14 S. T. 15 S. T. 51 N. T. 50 N. T. 49 N. T. 49 N.